MK BUIZEN HANDBOEK

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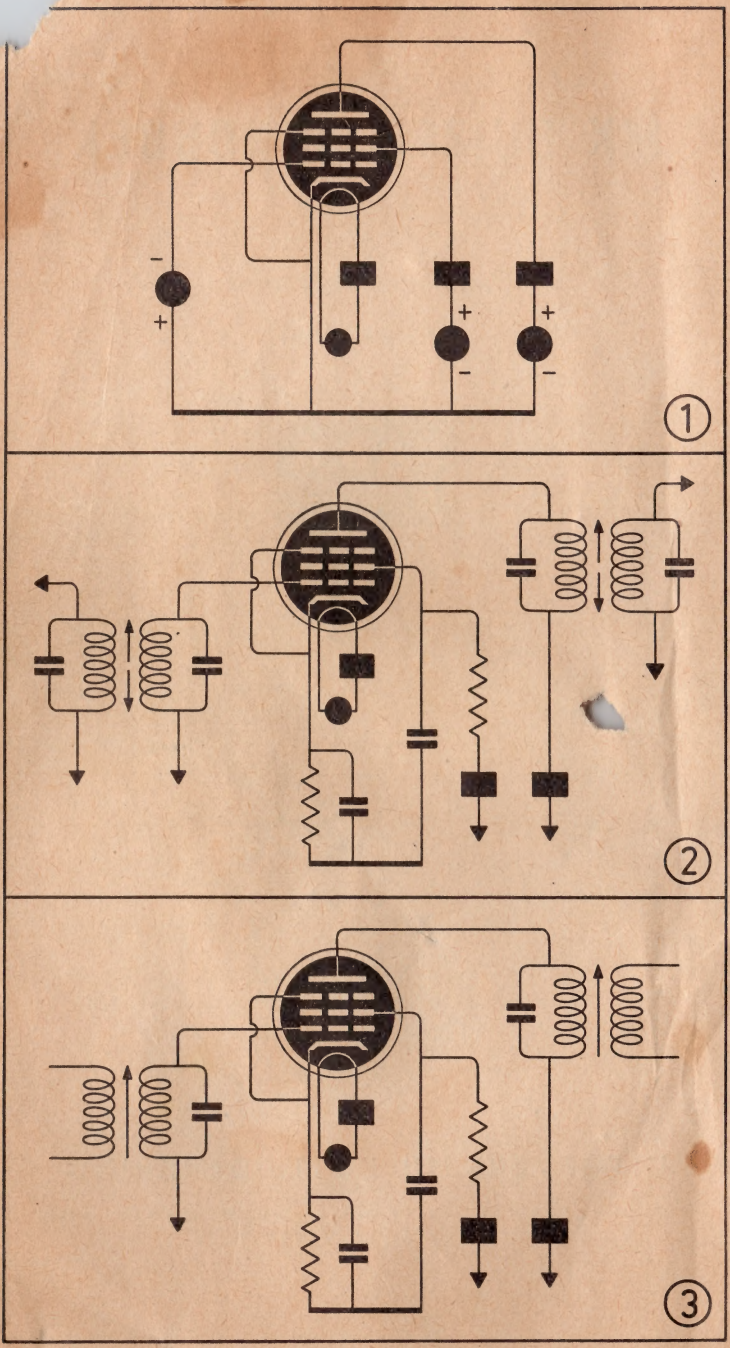
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INLEIDING

Dit handboek is zodanig ingericht dat een ieder, die in de practijk met electronenbuizen heeft te maken, gemakkelijk en snel de noodzakelijke bijzonderheden van elk buistype kan vinden.
Het bevat de belangrijkste gegevens van een groot aantal Europese en Amerikaanse buistypen voor ontvangtoestellen en versterkers, alsmede van kathodestraalbuizen voor TV toestellen en oscilloscopen en wel in zodanige vorm dat men in één oogopslag de karakteristieke eigenschappen en de electrode-aansluitingen van iedere radiobuis kan aflezen.

Dit is mogelijk omdat van elk buistype een schematisch schakelbeeld is gegeven waarin de optredende stromen en spanningen duidelijk zijn aangegeven, terwijl cijfers bij de electroden corresponderen met de nummering van de eveneens afgebeelde buisvoet. Bovendien is het schakelschema zo getekend, dat men onmiddellijk kan zien voor welke toepassing het betreffende buistype is bestemd.

Ter aanvulling van de volgens dit systeem vastgelegde karakteristieke eigenschappen zijn achter de betreffende groep nog tabellen opgenomen met verschillende instelgegevens voor een aantal buizen die zich bij uitstek lenen voor toepassing als RC-gekoppelde spanningsversterker. Voorts is bij elke groep een vergelijkingstabel opgenomen van buistypen die hetzij volkomen aan elkaar gelijk zijn dan wel alleen verschillen vertonen voorzover het gloeispanning en gloeistroom of de buisvoet betreft. Een vergelijkingstabel voor de door militaire instanties gebruikte type-aanduidingen is achter in dit boek (blz. 302) opgenomen.

Ook de gegevens van thyratrons, kathodestraalbuizen en een aantal veel voorkomende kristaldioden alsmede transistoren zijn in tabelvorm gegeven.

De verschillende soorten buizen zijn gerangschikt volgens 8 hoofdgroepen, welke ieder door een kleurband zijn gekenmerkt en wel als volgt:

I (oranje)	**Dioden** (gelijkrichters en detectoren)
II (groen)	**Trioden** (waaronder dubbeltrioden en (duo)diode-trioden)
III (geel)	**Tetroden en pentoden** (waaronder ook (duo)diode-pentoden)
IV (blauw)	**Eindbuizen** (trioden, tetroden, pentoden)
V (grijs)	**Frequentie omvormers** (z.g. mengbuizen zoals hexoden, heptoden, octoden, al of niet gecombineerd met oscillator-triode)
VI (rood)	**Combinatie-buizen** (trioden-pentoden, e.d.; triode-heptoden voorzover die zich lenen voor a.f.; m.f. en r.f. toepassingen)
VII (wit)	**Thyratrons** (gasgevulde trioden en tetroden) **kristaldioden en transistoren**
VIII (violet)	**Kathodestraalbuizen** (indicatorbuizen en beeldbuizen voor TV en oscilloscoop).

Regels voor gebruik

De indeling van dit boek maakt het mogelijk, dat men zowel de gegevens van een willekeurig buistype kan vinden, als ook een geschikte buis — bv. een triode, een gelijkrichter dan wel een pentode eindbuis — voor een bepaald doel gemakkelijk kan opzoeken.

In het eerstgenoemde geval verwijst het alfabetisch register (zie blz. 308) naar de bladzijde waar men de eigenschappen kan vinden. In het tweede geval zoekt men het buistype met de gewenste eigenschappen in de betreffende groep, waarna men nog de bij deze groep behorende vergelijkingstabel kan raadplegen om na te gaan of er eventueel een overeenkomstige buis onder een andere type-aanduiding bestaat.

In het algemeen zijn die karakteristieke gegevens vermeld, welke gelden voor de meest gebruikelijke anodespanningen, d.w.z. 250 V voor buizen, welke gewoonlijk in wisselstroomtoestellen worden toegepast en 90 V in het geval van buizen voor batterij-voeding. Hiervan is afgeweken indien:

a. de maximaal toelaatbare anodespanning kleiner is dan 250 V, resp. 90 V;
b. de fabrikant van het betreffende buistype alleen de gegevens voor afwijkende spanningen heeft opgegeven.

Daarnaast zijn voor buizen, waarvoor dit van bijzonder belang kan zijn, de gegevens voor twee of meer verschillende anodespanningen gegeven, in welk geval dan telkens een volledig schakelbeeld is opgenomen.

Gelijkrichters

Bij gelijkrichtbuizen is telkens een combinatie van maximale wisselspanning en maximale gelijkstroom aangegeven, in 't algemeen gebaseerd op het absolute maximum van de toelaatbare gelijkstroom. In enkele gevallen werd het absolute maximum van de wisselspanning als uitgangspunt genomen.

Pentoden

Of een pentode bruikbaar is voor a.f.- of m.f. en r.f. versterking is aangegeven door de tekenwijze van de schakeling en wel als volgt (zie blz. 4):

1. Is de buis voornamelijk of uitsluitend geschikt voor a.f. versterking, dan is een schakelbeeld volgens fig. 1 gebruikt, vermeldende de statische karakteristieken.
2. Voor buizen welke toepassing vinden in m.f. en r.f. trappen van normale omroep ontvangers geldt het schakelbeeld van fig. 2.
3. Pentoden welke speciaal zijn ontworpen voor het versterken van grote bandbreedte of zeer hoge frequenties (TV en FM toestellen) en welke niet zonder meer in normale m.f. versterkers voor middelfrequenties van 100 .. 500 kHz kunnen worden toegepast, zijn gekenmerkt door een schakelingsbeeld volgens fig. 3.

Is een buis geschikt voor toepassing van automatische versterkingsregeling dan zijn de letters AVR geplaatst bij het punt waaraan de regelspanning kan worden toegevoerd. Bovendien is dan het regelgebied aangegeven door twee getallen achter „Vg_1".

Eindbuizen

Van triode-, tetrode- en pentode-eindbuizen zijn de gebruikelijke klasse A instellingen gegeven. Voor een aantal typen zijn bovendien instelgegevens voor balanstrappen opgenomen.

VERKLARING VAN GEBRUIKTE SYMBOLEN EN AFKORTINGEN

6.3 voedingsspanning in volt

0.3 a. gloeistroom in ampere
b. anode- en schermroosterstroom in milliampere

10 signaalspanning in volt (effectieve waarde) resp. gelijk te richten wisselspanning.

belastingweerstand in kilohm en uitgangsenergie in watt.

= dezelfde buis met andere type aanduiding

dezelfde buis, maar andere gloeispanning en/of gloeistroom

dezelfde buis, maar andere voet.

A	spanningsversterking
AVR	automatische versterkingsregeling
d	totale vervorming bij de aangegeven waarde van Vo
I_a	anodestroom
I_{g2}	schermroosterstroom
I_k	kathodestroom ($I_a + I_{g2}$)
k	kilohm (= 1000 ohm)
M	megohm (= 1000.000 ohm)
mA	milliampere (= 0,001 ampere)
P_o	uitgangsenergie
R_a	anode belastingweerstand
R_{eq}	equivalente ruisweerstand aan het stuurrooster
R_{g1}	stuurroosterweerstand
R'_{g1}	stuurroosterweerstand van volgende buis
R_{g2}	schermroosterweerstand
R_i	inwendige weerstand
R_k	kathodeweerstand
S	steilheid
S_c	conversiesteilheid
S_H	steilheid van heptode
S_P	steilheid van pentode
S_T	steilheid van triode
V	volt
V_a	anodespanning
V_b	voedingsspanning
V_g	roosterspanning
V_{g1}	stuurroosterspanning
V_{g2}	schermroosterspanning
V_o	uitgangsspanning
V_{omax}	uitgangsspanning bij het inzetten van roosterstroom
W	watt
$W_{a(Pa)}$	anodedissipatie
μ	1. versterkingsfactor. 2. bij condensator: microfarad
μA	micro-ampere
μ_{g2g1}	versterkingsfactor van stuurrooster t.o.v. schermrooster.
Ω	ohm.

INTRODUCTION

The data contained in this book have been arranged in such a way that everbody dealing in practice with electronic tubes or valves may readily find all necessary particulars of any type.

The book covers the principal data of a large number of European and American types of receiver and amplifier tubes as well as on cathode ray tubes for TV-sets and oscilloscopes, arranged in such a manner that all relevant characteristic data and electrode connections of a given tube can be read off immediately.

This has been achieved by the insertion of a circuit diagram for each tube type, giving clearly indicated, currents and voltages, the figures printed near the electrodes corresponding with those of the base diagram, which is shown as well.

Moreover, the diagrams have been so designed that it can be ascertained at a glance for which application the tube in question is intended.

In addition to the characteristic data mentioned above, at the end of each section various operation details are tabulated for a number of tubes especially eligible for use as RC-coupled amplifiers.

Each section furthermore comprises a table of tube types either completely identical or otherwise only differing in filament voltage or filament current, or having a different base.

At the end of the book (page 302) is a comparative table of tube designations used by military authorities.

Finally, a table is included giving data on thyratrons, cathode ray tubes and a number of current crystal diodes and transistors.

The various types of tubes are arranged under 8 main headings, marked in the book with a coloured band, as follows:

I (Orange)	**Diodes** (rectifiers and detectors)
II (Green)	**Triodes** (comprising double triodes and (double) diode-triodes.
III (Yellow)	**Tetrodes and pentodes** (comprising (double) diode-pentodes)
IV (Blue)	**Output Tubes** (triodes, tetrodes, pentodes)
V (Grey)	**Frequency Converters** (so-called mixer tubes, such as hexodes, heptodes, octodes, whether or not combined with oscillator triode)
VI (Red)	**Combination Tubes** (triode-pentodes, etc; triode-heptodes, in as far as suitable for a.f., i.f. and r.f. applications)
VII (White)	**Thyratrons** (gas-filled triodes and tetrodes) **Cristal diodes and Transistors**
VIII (Purple)	**Cathode Ray Tubes** (Indicator tubes and picture tubes for TV and oscilloscope)

Directions for Use

The classification used in this book enables the user to find quickly data on any given tube type, or to find a suitable tube — e.g.

a triode, a rectifier or an output pentode — for any given purp

In the first instance the alphabetic index (see page 308) will refer the user to the page on which the characteristic data are to be found. In the second instance the type of tube having the sought-for characteristic data is to be looked up under the heading concerned while, in addition, the relevant comparative table may be consulted to find out whether an equivalent tube possibly occurs under a different designation. As a general rule, only those characteristic data are mentioned, which correspond with the more generally employed anode voltages, i.e. 250 volts for tubes commonly used in A.C. sets and 90 volts for battery powered tubes.

This rule does not apply when:

(a) the max. permissible anode voltage is smaller than 250 V or 90 V, respectively.

(b) the manufacturer of the tube type concerned has only stated the data for deviating voltages.
In addition and wherever these seem to be called for, data for two or more different anode voltages are given, using a complete connection diagram for each case.

Rectifiers

In the case of rectifiers, a combination of maximum A.C. voltage and maximum direct current is specified for each individual item, the combination being generally based on the maximum permissible direct current. However, in a few isolated cases on the absolute permissible maximum A.C. voltage has been used as the basis.

Pentodes

The manner in which the circuit diagram is drawn indicates, whether a pentode may be used as an a.f. or an i.f. and r.f. amplifier, viz. (see page 4):

(1) If the tube is mainly or exclusively suitable for a.f. amplification, a diagram as shown in fig. 2 is used, in which static characteristics are specified.

(2) For tubes finding application in i.f. and r.f. stages of standard type broadcast receivers, the circuit diagram of fig. 2 is applicable.

(3) Pentodes especially designed for amplifying broad bands or very high frequencies (TV and FM sets), which cannot be used to advantage unless associated with better than standard i.f. amplifiers for intermediate frequencies from 100 to 500 kc/s, are indicated by a circuit diagram according to fig. 3.
If a tube is suitable for application of automatic volume control, the letters AVR have been printed at the point to which the control voltage is to be supplied.
The control range is then additionally indicated by two values behind „V_{g1}".

Output tubes

Of triode, tetrode and pentode output tubes, the usual Class A operation data are given. Data for push-pull operation are also included for a number of types.

EXPLANATION OF SYMBOLS AND ABBREVIATIONS USED

Supply voltage, in volts

a. filament current, in amperes
b. anode and screen grid current in milliamperes

signal voltage, in volts. (R.M.S. value) or A.C. voltage to be rectified

Load resistance in kilohms and output power in watts

the same tube with different designation

the same tube, but with different filament voltage and/or current

the same tube, but with different base.

A	voltage amplification
AVR	Automatic volume control
d	total distortion at the specified value of Vo
I_a	anode current
I_{g2}	screen grid current
I_k	cathode current
k	kilohm (= 1000 ohms)
M	megohm (1,000,000 ohms)
mA	milliampere (= 0.001 ampere)
P_o	output power
Ra	Anode load resistance
R_{eq}	equivalent noise-resistance at control grid
R_{g1}	control grid resistor
R'_{g1}	control grid resistor of next tube
R_{g2}	screen grid resistor
Ri	plate resistance
R_k	cathode resistor
S	Mutual Conductance
S_c	Conversion conductance
S_H	Mutual conductance of heptode
SP	Mutual conductance of pentode
S_T	Mutual conductance of triode
V	Volts
V_a	anode voltage
V_g	grid voltage
V_b	supply voltage
V_{g1}	control grid voltage
V_{g2}	screen grid voltage
Vo	output voltage
Vomax	output voltage at the start of grid current
W	watt
Wa(Pa)	Anode dissipation
μ	1. amplification factor. 2. at condensor: microfarad
μA	micro-ampere
μ_{g2g1}	Amplification factor against screen grid
Ω	ohm

MUKADAMAT

Pembimbing ini disusun dengan tjara sedemikian hingga segala orang jang mengurus lampu[2] elektron dalam praktek dapat memperoleh ketentuan[2] jang perlu tentang setiap matjam lampu radio dengan mudah dan tjepat. Buku ini memuat keterangan[2] jang paling penting tentang banjak matjam[2] lampu radio dari Eropah dan Amerika untuk penerima[2] dan penguat[2], dan tentang lampu[2] sinar katoda untuk pesawat[2] televisi dan osiloskop[2]. Keterangan[2] itu disusun sedemikian hingga orang dapat membatja sifat[2] tjiri dan hubungan[2] elektroda tentang tiap[2] lampu radio dalam sekedjap mata.

Hal itu dimungkinkan oleh karena dari tiap[2] matjam lampu radio diberikan suatu bagan hubungan pada mana arus[2] dan tegangan[2] jang berlaku ditandakan dengan terang, sedangkan angka[2] pada elektroda[2] sesuai dengan nomor[2] kaki lampu radio jang digambarkan djuga.

Lagi pula bagan hubungan digambarkan sedemikian sehingga orang dapat melihat dengan selajang pandang untuk penglaksanaan mana matjam lampu radio jang bersangkutan diperuntukkan.

Untuk melengkapan sifat[2] tjiri jang ditetapkan menurut sistim ini dibelakang tiap[2] golongan dimuatkan beberapa daftar lagi dengan berbagai-bagai keterangan[2] penetapan untuk beberapa lampu[2] radio jang baik benar untuk dipakai seperti penguat tegangan jang dihubungkan -RC. Lagi pula pada tiap[2] golongan dimuat suatu daftar matjam[2] lampu radio baik jang benar[2] sama, maupun hanja berbedaan mengenai tegangan pidjar dan arus pidjar, atau kakinja. Suatu daftar perbandingan untuk penundjukkan[2] matjam jang dipakai oleh Bagian[2] Militér dimuatkan dibelakang buku ini. (lihat halaman 302).

Keterangan[2] tentang tiratron[2], lampu[2] sinar katoda, beberapa dioda kristal dan transistora[2] jang banjak terdapat diberikan djuga dalam beberapa daftar.

Rupa[2] lampu radio disusun menurut 8 golongan utama jang masing[2] ditandai dengan sebuah ban berwarna sebagai berikut:

I (pinang masak)	**Dioda**[2] (perata[2] arus dan detektor[2])
II (hidjau)	**Trioda**[2] (antara lain trioda[2] berganda, trioda[2]-dioda dan trioda[2]-dioda berganda)
III (kuning)	**Tetroda**[2] **dan pentoda**[2] (antara lain djuga pentoda[2]-dioda dan pentoda[2]-dioda berganda)
IV (biru)	**Lampu**[2] **terachir** (trioda[2], tetroda[2] pentoda[2])
V (kelabu)	**Pengubah frekuénsi** (jang dimaksudkan lampu[2] tjampur sebagai heksoda[2], heptoda[2], oktoda[2], digabungkan atau tidak dengan trioda-osilator)
VI (mérah)	**Lampu**[2]**-kombinasi** (pentoda[2]-trioda, dsb.: heptoda[2]-trioda sekedar lampu[2] itu dapat dipakai untuk frekuénsi rendah, atau frekuénsi tengah dan tinggi)
VII (putih)	**Tiratron**[2] (trioda[2] dan tetroda[2] jang diisi dengan gas) **dioda**[2] **kristal dan transistora**
VIII (lembajung)	**Lampu**[2] **sinar katoda** (lampu[2] indikator dan televisi dan osiloskop)

Petundjuk Pemakaian

Pembagian buku ini memungkinkan orang baik untuk lekas dapat menemui keterangan[2] tentang sebarang lampu radio maupun

untuk dengan mudah mentjari sesuatu lampu jang serasih untuk maksud tertentu — ump. sebuah trioda, sebuah perata-arus atau sebuah lampu terachir pentoda.

Dalam hal pertama daftar menurut abdjad menundjukkan halaman (lihat halaman 308) diamana orang dapat mengetahui sifat[2] itu. Dalam hal kedua orang mentjari matjam lampu dengan sifat[2] jang dikehendaki dalam golongan jang bersangkutan setelah mana orang masih dapat membatja daftar perbandingan jang turut golongan ini untuk menjelidiki apakah mungkin sesuatu lampu sesuai dibawah penundjukan matjam jang lain.

Pada umumnja jang diberitahukan, ialah keterangan[2] tjiri jang berlaku djika lampu jang bersangkutan diisi pada tegangan[2] anoda jang paling lazim, jaitu 250 V untuk lampu[2] jang biasanja dipakai dalam pesawat arus bolak-balik, dan 90 V kalau dipakai seperti lampu[2] untuk pengisian baterai. Dalam pada itu adahali jang menjimpang, jakni djikalau:

a. tegangan anoda tertinggi jang dapat diizinkan lebih ketjil daripada 250 V, masing[2] 90 V;
b. paberik jang membuat matjam lampu jang bersangkutan tjuma memberikan keterangan[2] jang berlaku untuk tegangan[2] anoda jang menjimpang.

Lain daripada itu buat lampu[2] diberikan keterangan[2] untuk tegangan[2] dua atau lebih anoda jang berbeda dimana keterangan[2] itu penting sekali, maka tiap[2] kali dimuatkan suatu bagan hubungan jang lengkap.

Perata[2] arus.

Pada lampu[2] perata arus tiap[2] kali diberitahukan suatu gabungan tekanan bolak-balik tertinggi dan arus searah tertinggi, gabungan itu pada umumnja berdasarkan maksimum mutlak dari arus searah jang dapat diizinkan. Dalam beberapa hal maksimum mutlak dari tekanan bolak-balik dipilih sebagai dasar.

Pentoda[2]

Apakah sebuah pentoda dapat dipakai untuk penguatan frékuénsi rendah atau frékuénsi tengah dan tinggi diberitahukan oleh tjara menggambarkan hubungan, jaitu sebagai berikut:

1. Djikalau lampu radio terutama atau melulu untuk penguatan frékuénsi rendah, maka dipakai suatu bagan hubungan menurut luk. 1, jang menjebutkan sifat[2] tjiri statis.
2. Untuk lampu[2] jang dilaksanakan dalam tingkatan[2] frékuénsi tengah dan tinggi dari penerima[2] penjiar jang biasa berlaku bagan hubungan pada luk. 2.
3. Pentoda[2] jang pada chususnja dirantjanakan untuk menguatkan ban lebar atau frékuénsi[2] jang sangat tinggi (pesawat[2] televisi dan modulasi frekuénsi), dan jang tidak dapat dilaksanakan demikian sadja dalam penguat[2] frékuénsi tengah dari 100 . . . 500 kiloperioda tiap detik, ditanda-tjirikan oleh bagan hubungan menurut luk. 3.

Djikalau sebuah lampu radio serasih untuk dipakai buat pengatur kekuatan otomatik, maka huruf[2] "A V R" dibubuhi pada titik dimana tekanan pengatur dapat dihantarkan. Lagi pula dalam hal itu daerah pengatur diberitahukan dengan dua bilangan dibelakang "Vg_1".

Lampu[2] terachir

Tentang lampu[2] terachir trioda, tetroda dan pentoda diberikan penetapan kelas A jang lazim. Lain daripada itu untuk beberapa matjam dimuatkan keterangan[2] penetapan buat tingkat[2] timbangan.

KETERANGAN TENTANG TANDA² DAN KEPENDEKAN DIPAKAI

Tegangan pengisian dalam Volt.

Arus pidjar dalam Ampere.
Arus anoda dan arus kisi-lindung dalam miliampere.

Tegangan sinjal dalam Volt (nilai berguna) masing² tegangan bolakbalik jang harus diratakan.

Tahanan beban dalam kilo-ohm dan tenaga dasar dalam Watt.

Lampu radio jang sama, tetapi matjamnja ditandakan tjara lain.

Lampu radio jang sama, tetapi tegangan pidjar-dan/atau arus pidjarnja lain.

Lampu radio jang sama, tetapi kakinja lain.

A	Penguatan tegangan.
AVR	P.K.O.
d	Djumlah perubahan bentuk pada nilai jang diberitahukan pada Vo.
I_a	Arus anoda.
I_{g2}	Arus kisi-lindung.
I_k	Arus katoda. (I_a+I_{g2})
k	Kilo-ohm (= 1000 ohm).
M	Megohm (= 1.000.000 ohm).
mA	Miliampere (= 0,001 Ampere).
P_o	Tenaga keluar.
R_a	Tahanan beban anoda.
R_{eq}	Tahanan desah tara pada kisi-kemudi.
R_{g1}	Tahanan kisi-kemudi.
R'_{g1}	Tahanan kisi-kemudi dari lampu jang berikut.
R_{g2}	Tahanan kisi-lindung.
R_i	Tahanan dalam.
R_k	Tahanan katoda.
S	Tjuramnja.
S_c	Tjuramnja konversi.
S_H	Tjuramnja heptoda.
SP	Tjuramnja pentoda.
S_T	Tjuramnja trioda.
V	Volt.
V_a	Tegangan anoda.
V_b	Tegangan pengisian
V_g	Tegangan kisi.
V_{g1}	Tagangan kisi-kemudi.
V_{g2}	Tegangan kisi-lindung.
V_o	Tegangan keluar
$V_{o\,max}$	Tegangan keluar bila arus kisi bermula.
W	Watt.
Wa(Pa)	Disipasi anoda.
μ	1. Faktor penguat. 2. Mikro (pada kondensator: mikrofarad).
μA	Mikroampere.
μ_{g2g1}	Faktor penguat kisi-kemudi terhadap kisi-lindung.
Ω	Ohm.

INTRODUCTION

Le présent manuel est aménagé de manière à permettre que tous ceux qui ont à s'occuper en pratique de tubes électroniques puissent y trouver facilement et vite les renseignements dont ils ont besoin sur tout type de tube. Il contient les caractéristiques techniques principales d'un grand nombre de types de tubes européens et américains, pour récepteurs et amplificateurs, ainsi que de tubes à rayons cathodiques pour postes de télévision et oscillographes, sous une forme permettant d'embrasser d'un coup d'œil les propriétés caractéristiques et les connexions des électrodes de tout tube radio voulu.

Ceci a été rendu possible par la reproduction d'un schéma de connexions dans lequel sont marquées clairement les valeurs des courants et des tensions, les chiffres près des électrodes correspondant à ceux du culot du tube, également représenté.

En outre, le schéma de connexions a été dessiné de manière à montrer immédiatement à quelle application le type de tube concerné est destiné.

Pour compléter les propriétés techniques données suivant ce système, chaque groupe se termine par des tableaux donnant des caractéristiques de réglage pour un certain nombre de tubes excellemment appropriés à l'emploi comme amplificateur de tension couplé par résistance et capacité. En outre, nous donnons pour chaque groupe un tableau comparatif des types de tubes étant soit entièrement identiques, soit uniquement différents par la tension ou le courant de chauffage, ou encore par leur culot. Un tableau comparatif des références de types utilisées par les organes militaires est reproduit à la fin du livre (page 302).

Les données de thyratrons, de tubes à rayons cathodiques, de certaines diodes à cristal et de transistors figurent également dans un tableau.

Les différents types de tubes sont classés en huit groupes principaux, indiqués chacun par une bande de couleur distinctive, suivant la division ci-dessous:

I	(orange)	**Diodes** (redresseurs et détecteurs)
II	(vert)	**Triodes** (parmi lesquelles les doubles triodes et les (duo)diodes-triodes)
III	(jaune)	**Tétrodes et pentodes** (parmi lesquelles les (duo)-diodes-pentodes)
IV	(bleu)	**Tubes de puissance** (triodes, tétrodes, pentodes)
V	(gris)	**Changeurs de fréquence** (tubes hétérodynes tels que hexodes, heptodes, octodes, combinées ou non à la triode oscillatrice)
VI	(rouge)	**Tubes combinés** (triodes-pentodes, etc.; triodes-heptodes dans la mesure où cellis-ci sont applicables en BF, en MF et en HF)
VII	(blanc)	**Thyratrons** (triodes et tétrodes à atmosphère gazeuse) **diodes à crystal et transistors**
VIII	(violet)	**Tubes à rayon cathodiques** (indicateurs d'accord et tubes d'image pour la télévision et les oscillographes).

Mode d'emploi

La division de ce livre permet de trouver rapidement les renseignements recherchés concernant un type de tube déterminé, mais aussi de trouver facilement un tube approprié — par exemple une triode, une valve redresseuse ou une pentode de puissance — pour une application envisagée.

Dans le premier cas, l'index alphabétique (voir page 308) renvoie à la page où se trouvent les propriétés recherchées. Dans le second cas, on cherche le type de tube possédant les propriétés dans le groupe concerné; on peut ensuite encore consulter le tableau comparatif correspondant à ce groupe, qui indique s'il existe éventuellement un tube analogue portant un autre numéro de type.

En général, nous avons indiqué les propriétés caractéristiques en fonction des tensions anodiques les plus courantes, c'est-à-dire 250 V pour les tubes ordinairement employés dans les appareils à courant alternatif et 90 V pour les tubes conçus pour l'alimentation par pile. Nous avons fait exception à cette règle dans les cas où:

a. la tension anodique maxima admissible est inférieure à 250 V, ou respectivement à 90 V;
b. le fabricant du type de tube concerné fournit uniquement les spécifications pour des tensions différentes.

Par ailleurs, nous indiquons pour les tubes pour lesquels ces renseignements peuvent être d'importance spéciale, les valeurs caractéristiques pour deux tensions anodiques ou plus; dans ce cas, le schéma de connexions complet est toujours indiqué.

Redresseurs

Pour les valves redresseuses, le répertoire indique une combinaison de tensions alternatives maxima et de courants continus maxima, lesquelles valeurs sont généralement basées sur le maximum absolu du courant continu admissible. Dans quelques cas, le maximum absolu de la tension alternative est pris comme point de départ.

Pentodes

La méthode de dessin des connexions indique de la façon suivante si une pentode est prévue pour l'amplification en BF ou en MF et HF (voir p. 4):

1. Si le tube est principalement ou exclusivement prévu pour l'amplification BF, le schéma est du genre de la figure 1, indiquant les caractéristiques statiques.
2. Le schéma de la figure 2 est employé pour les tubes trouvant application dans les étages HF et MF des récepteurs normaux de radiodiffusion.
3. Les pentodes spécialement conçues pour l'amplification de bandes larges ou de fréquences très élevées (postes de télévision et de FM) et qui ne peuvent pas être employées sans plus dans les amplificateurs MF normaux pour les moyennes fréquences de 100-500 kc/s, sont caractérisées par un schéma suivant la figure 3.

Lorsqu'un tube permet l'application de la commande automatique du volume, le point auquel la tension régulatrice peut être appliquée est marqué AVR. En outre, la plage de régulation est alors indiquée par deux valeurs après "Vg_1".

Tubes de puissance

Pour les tubes de puissance: triodes, tétrodes et pentodes, nous avons indiqué les régimes classe A usuels. Pour certains types nous indiquons en outre les valeurs pour l'emploi en push-pull.

TABLE DES SYMBOLES ET DES ABRÉVIATIONS
employés dans ce répertoire

tension d'alimentation en volts

a. courant de chauffage en ampères
b. courant anodique et de grille-écran en milliampères

tension d'un signal en volts efficaces, ou tension alternative à redresser

résistance de charge en k.ohms et puissance de sortie en watts

le même tube portant une désignation de type différente

le même tube, à tension ou/et courant de chauffage différentes

le même tube, à culot différent

A	amplification de tension
AVR	commande automatique de volume
d	distorsion totale à la valeur indiquée de V_0
I_a	courant anodique
I_{g2}	courant de grille-écran
I_k	courant cathodique ($I_a + I_{g2}$)
k	k.ohm (= 1000 ohms)
M	mégohm (= 1000 000 ohms)
mA	milliampère (= 0,001 ampère)
P_o	énergie de sortie
R_a	résistance de charge anodique
R_{eq}	résistance équivalente de souffle à la grille de commande
R_{g1}	résistance de grille de commande
R'_{g1}	résistance de grille de commande du tube suivant
R_{g2}	résistance de grille-écran
R_i	résistance interne
R_k	résistance cathodique
S	pente
S_c	pente de conversion
S_H	pente de l'élément heptode
SP	pente de l'élément pentode
S_T	pente de l'élément triode
V	volt
V_a	tension anodique
V_b	tension d'alimentation
V_g	tension de grille
V_{g1}	tension de grille de commande
V_{g2}	tension de grille-écran
V_o	tension de sortie
V_{omax}	tension de sortie à la naissance du courant de grille
W	watt
$W_{a(Pa)}$	dissipation anodique
μ	1. facteur d'amplification 2. pour un condensateur: microfarad
μA	microampère
μ_{g2g1}	facteur d'amplification de la grille de commande à la grille-écran
Ω	ohm

EINLEITUNG

Dieses Handbuch ist so eingerichtet, daß jeder, der sich in der Praxis mit Elektronenröhren zu beschäftigen hat, leicht und schnell die für ihn wichtigen Daten jedes Röhrentyps finden kann.

Das Buch enthält die wichtigsten Daten einer großen Anzahl europäischer und amerikanischer Röhrentypen für Rundfunkempfänger und Verstärker, sowie von Kathodenstrahlröhren für Fernsehempfänger und Oszillographen; alles ist so angeordnet, daß man mit einem Blick die charakteristischen Eigenschaften und die Elektroden-Anschlüsse jeder Rundfunk-Röhre ablesen kann.

Dies wurde dadurch ermöglicht, daß für jeden Röhrentyp ein Schaltbild gezeichnet wurde, in dem die auftretenden Ströme und Spannungen deutlich angegeben sind; die Ziffern bei den Elektroden stimmen mit der Nummerierung der ebenfalls abgebildeten Röhrensockel überein.

Außerdem ist das Schaltbild so gezeichnet, daß man unmittelbar erkennen kann, für welchen Verwendungszweck der betreffende Röhrentyp bestimmt ist.

Zur Ergänzung der nach diesem System festgelegten kennzeichnenden Eigenschaften wurden am Ende jedes Abschnittes noch Tabellen mit verschiedenen Einstelldaten für eine Anzahl Röhren aufgenommen, die sich ganz besonders für die Verwendung als RC-gekoppelte Spannungsverstärker eignen. Weiterhin findet man bei jeder Gruppe eine Vergleichstabelle von Röhrentypen, die entweder einander völlig gleich sind, oder nur Unterschiede hinsichtlich der Heizspannung, des Heizstromes oder des Röhrensockels zeigen. Weiterhin enthält dieses Buch (S. 302) eine Vergleichstabelle für die von Militärinstanzen verwendeten Typenbezeichnungen.

Auch die Daten von Thyratrons, Kathodenstrahlröhren und einer Anzahl häufig vorkommender Kristalldioden und Transistoren sind in Tabellenform wiedergegeben.

Die verschiedenen Röhrensorten sind in acht Hauptgruppen eingeteilt, die jeweils durch einen Farbstreifen gekennzeichnet sind. Die Einteilung wurde folgendermaßen vorgenommen:

I (Orange)	**Dioden** (Gleichrichter und Detektoren)
II (Grün)	**Trioden** (hierunter Doppeltrioden und (Doppel)-dioden Trioden)
III (Gelb)	**Tetroden und Pentoden** (hierunter auch (Doppel)-dioden-Pentoden)
IV (Blau)	**Endröhren** (Trioden, Tetroden, Pentoden)
V (Grau)	**Frequenzwandler** (Mischröhren wie Hexoden, Heptoden, Oktoden, kombiniert oder nicht kombiniert mit Oszillator-Triode)
VI (Rot)	**Kombinations-Röhren** (Trioden-Pentoden u.a.m.; Trioden-Heptoden, soweit sie sich für Anwendung auf den Gebieten der Hoch-, Zwischen- und Niederfrequenz eignen)
VII (Weiss)	**Thyratrons** (Gasgefüllte Trioden und Tetroden), **Kristall dioden und Transistoren.**
VIII (Violett)	**Kathodenstrahlröhren** (Abstimmanzeiger und Bildröhren für Fernsehgeräte und Oszillographen)

Gebrauchsanweisung

Die Einteilung dieses Buches ermöglicht sowohl ein schnelles Aufsuchen der Daten eines beliebigen Röhrentyps, als auch das Finden einer geeigneten Röhre, z.B. einer Triode, einer Gleichrichterröhre oder einer Pentoden-Endröhre für einen bestimmten Verwendungszweck.

Im ersteren Fall weist das alphabetische Register (siehe Seite 308) auf die Seite hin, auf der man die Eigenschaften finden kann. Im letzteren Fall sucht man den Röhrentyp mit den gewünschten Eigenschaften in der betreffenden Gruppe, wobei man noch die zu dieser Gruppe gehörende Vergleichstabelle benutzen kann, um zu untersuchen, ob es möglicherweise eine übereinstimmende Röhre noch unter einer anderen Typenbezeichnung gibt.

Im allgemeinen sind die kennzeichnenden Daten, die für die gebräuchlichsten Anodenspannungen gelten, angegeben, d.h. 250 V für Röhren, die gewöhnlich in Wechselstromgeräten Verwendung finden, und 90 V für Röhren mit Batteriespeisung.

Hiervon wurde jedoch abgewichen, wenn:

a) die maximal zulässige Anodenspannung kleiner als 250 V bezw. 90 V ist;
b) der Fabrikant des betreffenden Röhrentyps nur die Daten für abweichende Spannungen angegeben hat.

Daneben wurden für Röhren, bei denen dies besonders wichtig sein kann, die Daten für zwei oder mehrere verschiedene Anodenspannungen gegeben; in solchen Fällen wurde dann jeweils ein vollständiges Schaltbild abgedruckt.

Gleichrichter

Bei Gleichrichterröhren wurde jedes Mal eine Kombination maximaler Wechselspannung mit maximalem Gleichstrom angegeben, die im allgemeinen auf das absolute Maximum des zulässigen Gleichstromes basiert ist. In einigen Fällen wurde das absolute Maximum der Wechselspannung als Ausgangspunkt gewählt.

Pentoden

Ob eine Pentode für Nieder- oder Zwischen- und Hochfrequenzverstärkung geeignet ist, wird durch die Art des Schaltbildes, und zwar folgendermaßen, angegeben (s. Seite 4):

1. Wenn sich die Röhre hauptsächlich oder ausschließlich für Niederfrequenzverstärkung eignet, so wird ein Schaltbild nach Abbildung 1 verwendet, worin die statischen Kennlinien eingezeichnet sind.
2. Für Röhren, die in Zwischen- und Hochfrequenzstufen normaler Rundfunk-Empfänger Verwendung finden, gilt das Schaltbild nach Abbildung 2.
3. Pentoden, die speziell zur Verstärkung großer Bandbreiten oder sehr hoher Frequenzen entwickelt wurden (Fernseh- und FM-Empfänger), und die nicht ohne weiteres in normalen ZF-Verstärkern für Zwischenfrequenzen von 100 — 500 kHz verwendet werden können, sind durch ein Schaltbild wie Abbildung 3 gekennzeichnet.

Eignet sich eine Röhre für selbsttätigen Schwundausgleich, so stehen die Buchstaben AVR an dem Punkt, der an die Regelspannung gelegt werden kann. Außerdem ist dann das Regelgebiet durch zwei Werte hinter "Vg_1" angegeben.

Endröhren

Von Trioden-, Tetroden- und Pentoden-Endröhren sind die üblichen Klasse A-Einstellungen gegeben. Für eine Anzahl von Typen wurden außerdem Einstelldaten für Gegentaktstufen aufgenommen.

ERLÄUTERUNGEN DER VERWENDETEN SYMBOLE UND ABKÜRZUNGEN

Speisespannung in Volt

a. Heizstrom in Ampere
b. Anoden- und Schirmgitterstrom in Milliampere

Signalspannung in Volt (Effektivwert) bezw. gleichzurichtende Wechselspannung

Belastungswiderstand in kOhm und Ausgangsleistung in Watt

dieselbe Röhre mit anderer Typenbezeichnung

dieselbe Röhre, aber andere Heizspannung und/oder Heizstrom

dieselbe Röhre mit anderem Sockel

A	Spannungsverstärkung
AVR	selbsttätiger Schwundausgleich
d	totale Verzerrung beim angegebenen Wert von V_c
I_a	Anodenstrom
I_{g2}	Schirmgitterstrom
I_k	Kathodenstrom ($I_a + I_{g2}$)
k	kOhm (= 1000 Ohm)
M	Megohm (= 1 000 000 Ohm)
mA	Milliampere (= 0,001 Ampere)
P_o	Ausgangsleistung
R_a	Anodenbelastungs-Widerstand
R_{eq}	äquivalenter Rauschwiderstand am Steuergitter
R_{g1}	Steuergitter-Widerstand
R'_{g1}	Steuergitter-Widerstand der folgenden Röhre
R_{g2}	Schirmgitter-Widerstand
R_i	Innenwiderstand
R_k	Kathodenwiderstand
S	Steilheit
S_c	Misch-Steilheit
S_H	Steilheit der Heptode
S_P	Steilheit der Pentode
S_T	Steilheit der Triode
V	Volt
V_a	Anodenspannung
V_b	Speisespannung
V_g	Gitterspannung
V_{g1}	Steuergitterspannung
V_{g2}	Schirmgitterspannung
V_o	Ausgangsspannung
V_{omax}	Ausgangsspannung am Beginn des Gitterstromes
W	Watt
$W_{a\,(Pa)}$	Anodenverlust
μ	1.) Verstärkungsfaktor ($\frac{1}{\mu} \times 100\,\% =$ Durchgriff) 2.) bei einem Kondensator: Mikrofarad
μA	Mikroampere
μ_{g2g1}	Verstärkungsfaktor Steuergitter gegen Schirmgitter
Ω	Ohm

INLEDNING

Denna handbok är uppställd på sådant sätt, att var och en, som i praktiken har att göra med elektronrör, lätt och fort kan finna erforderliga upplysningar om olika rörtyper.

Den innehåller de viktigaste uppgifterna om ett stort antal europeiska och amerikanska rör för mottagare och förstärkare samt katodstrålerör för TV-mottagare och oscilloskop. Uppställningen är gjord så att man snabbt kan få reda på de karakteristiska egenskaperna och elektrodanslutningarna för varje rörtyp.

För varje rörtyp finns nämligen ett kopplingsschema med värden för strömmar och spänningar tydligt angivna och siffror vid elektroderna svarande mot den avbildade rörsockelns stiftnumrering. Dessutom är kopplingsschemat ritat så att man genast kan se för vilket ändamål rörtypen är avsedd.

Som komplettering till de karakteristiska egenskaperna finnas även tabeller med olika driftsdata för en del rör, som äro särskilt lämpliga för RC-kopplade spänningsförstärkare. Vidare finnes jämförelsetabeller för rörtyper, som antingen äro identiska eller endast skiljer sig i fråga om glödspänning och glödström eller rörsockel.

En jämförelsetabell för de av vissa militära instanser använda typbeteckningarna finnes i slutet av boken på sidan 302.

Det finnes även tabeller med uppgifter om tyratroner, katodstrålerör och en del ofta förekommande kristalldioder samt transistorer.

De olika rörtyperna äro uppdelade i följande åtta huvudgrupper som var och en har sin särskilda färg:

I (orange)	**Dioder** (likriktare och detektorer)
II (grön)	**Trioder** (inkl. dubbeltrioder och (duo) diodtrioder)
III (gul)	**Tetroder och pentoder** (inkl. även (duo) diodpentoder)
IV (blå)	**Slutrör** (trioder, tetroder, pentoder)
V (grå)	**Frekvensomformare** (s.k. blandarrör, såsom hexoder, heptoder, oktoder, kombinerade med eller utan oscillatortriod)
VI (röd)	**Kombinationsrör** (triodpentoder, o. dyl., triodheptoder försåvida de äro användbara till hög-, mellan- och lågfrekvens)
VII (vit)	**Tyratroner** (gasfyllda trioder och tetroder) **kristalldioder och transistorer**
VIII (violett)	**Katodstralerör** (indikatorrör och bildrör för TV och oscilloskop)

Anvisningar

Man kan på grund av den uppställningen boken har lätt finna erforderliga uppgifter för vilken rörtyp som helst, men också ett passande rör, t.ex. en triod, en likriktare eller ett pentodslutrör. Det alfabetiska registret (se sid 308) hänvisar till sidan där man finner rörets egenskaper och söker man en rörtyp med vissa egenskaper går man till ifrågavarande huvudgrupp. Därefter kan man även rådfråga jämförelsetabellen, som hör till denna grupp, för att se om det eventuellt finnes ett överensstämmande rör under en annan typbeteckning.

I allmänhet hänför sig de karakteristiska uppgifterna till de mest använda anodspänningarna, dvs. 250 V för rör, som vanligtvis användas i växelströmsapparater och 90 V för batterirör. Detta gäller dock inte i följande fall:

a. om den maximalt tillåtna anodspänningen är mindre än 250 V, resp. 90 V.
b. om den ifrågavarande rörtypens fabrikant endast har lämnat uppgifter om avvikande spänningar.

Dessutom lämnas för rör, där detta är av sarskild betydelse, uppgifter för två eller flera anodspänningar; därvid finnes för varje anodspänning ett fullständigt kopplingsschema.

Likriktare

För likriktarrör finnes alltid angivet en kombination av maximal spänning och maximal ström, i allmänhet baserad på den tillåtna likströmmens absoluta maximum. I några enstaka fall har som utgångspunkt tagits växelspänningens absoluta maximum.

Pentoder

Pentodernas användningsområde beträffande låg- eller högfrekvensförstärkning har angivits på kopplingsschemat enligt följande (se sid. 4):

1. Om röret huvudsakligen eller uteslutande lämpar sig för lågfrekvensförstärkning, användes kopplingsschema enligt fig. 1, som anger de statiska egenskaperna.
2. För rör, som användas för mellan- och högfrekvensstegen i normala radiomottagare, gäller kopplingsschema enligt fig. 2.
3. För pentoder, speciellt gjorda för bredbandsförstärkning eller mycket höga frekvenser (TV och FM-apparater) och vilka icke utan vidare kunna användas i normala mellanfrekvensförstärkare med en mellanfrekvens av 100—500 kHz, användas kopplingsschema enligt fig. 3.

Lämpar sig ett rör för automatisk förstärkningsreglering placeras bokstäverna AVR vid den punkt, där regleringsspänningen kan anslutas. Dessutom är regleringsområdet angivet genom två tal bakom "V_{g1}".

Slutrör

För triod-, tetrod- och pentodslutrör angivas de vanliga inställningarna, klass A. För en del typer finnas dessutom inställningsuppgifter för balanssteg.

FÖRKLARING PA ANVÄNDA TECKEN OCH FÖRKORTNINGAR

driftspänning i volt

a. glödström i ampere
b. anod- och skärmgallerström i milliampere

signalspänning i volt (effektiva värdet) resp. växelspänningen, som skall likriktas

belastningsmotstånd i kiloohm och utgångsenergi i watt

samma rör, men annan typbeteckning

samma rör, men annan glödspänning och/eller glödström

samma rör, men annan sockel

A	spänningsförstärkning
AVR	automatisk förstärkningsreglering
d	total distorsion vid det angivna värdet av V_o
I_a	anodström
I_{g2}	skärmgallerström
I_k	katodström ($I_a + I_{g2}$)
k	kiloohm (= 1.000 ohm)
M	megohm (= 1.000.000 ohm)
mA	milliampere (= 0,001 ampere)
Po	utgångsenergi
R_a	anodbelastningsmodstånd
R_{eq}	ekvivalent brusmodstånd vid styrgallret
R_{g1}	styrgallermodstånd
R'_{g1}	styrgallerresistáns av efterföljande rör
R_{g2}	skärmgallermodstånd
R_i	invändig modstånd
R_k	katodmodstånd
S	branthet
S_c	blandningsbranthet
S_H	brandhet för heptod
S_P	branthet för pentod
S_T	branthet för triod
V	volt
V_a	anodspänning
V_b	driftspänning
V_g	gallerspänning
V_{g1}	styrgallerspänning
V_{g2}	skärmgallerspänning
V_o	utgångsspänning
V_{omax}	utgångsspänning vid gallerströmmens början
W	watt
$W_{a(Pa)}$	anodförlust
μ	1. förstärkningsfaktor; 2. vid kondensator: mikrofarad
μA	mikroampere
μ_{g2g1}	förstärkningsfaktor av styrgaller med avseende på skärmgallret
Ω	ohm

INTRODUCCION

Este manual está concebido de tal manera que todos quienes se ocupan con las válvulas electrónicas en la práctica pueden encontrar los detalles necesarios de cada tipo de válvula pronto y fácilmente.

Contiene los datos principales de un número considerable de tipos de válvulas americanos y europeos para receptores y amplificadores, así como de los tubos de rayos catódicos para los aparatos de televisión y oscilógrafos; todo eso en una forma que permite la lectura a prima vista de las propiedades características y conexiones de eléctrodo de cada válvula.

Esto queda posible por haberse dado un esquema de conexión de cada tipo de válvula, en el cual se han indicado las corrientes y tensiones con suma claridad; los eléctrodos están marcados por números correspondientes a los pies de válvula, que también están dibujados.

A más de esto el esquema de conexión está dibujado de tal manera que se puede ver en seguida la aplicación debida del tipo de válvula en cuestión.

Las propiedades características reproducidas así se hallan complementadas por las tablas que siguen cada grupo, que contienen varios datos de ajuste para tubos muy apropiados para servir de amplificadores de tensión acoplados por resistencia y capacidad. Además cada grupo contiene una tabla comparativa de válvulas completamente idénticas o diferentes en cuanto a la tensión y corriente de filamento o al pie de válvula solamente. Al final del libro (pag. 302) se encuentra también una tabla comparativa de las indicaciones de tipos empleadas por los servicios militares.

Los datos acerca de los tiratrones, tubos de rayos catódicos y algunos diodos de cristal y transistores de empleo frecuente quedan incluidos en tablas.

Los diferentes tipos de válvulas están divididos en 8 grupos principales, diferenciados por medio de cintas coloradas de la siguiente manera:

I (anaranjado)	**Diodos** (rectificadoras y detectoras)
II (verde)	**Triodos** (triodos dobles y (duo)diodos-triodos incluidos)
III (amarillo)	**Tetrodos y pentodos** ((duo)diodos-pentodos incluidos)
IV (azul)	**Válvulas finales** (triodos, tetrodos, pentodos)
V (gris)	**Conversores de frecuencia** (las llamadas mezcladoras, tales como hexodos, heptodos, octodos, sean o no combinados con triodo oscilador)
VI (rojo)	**Válvulas combinadas** (triodos-pentodos etc., aquellos triodos-heptodos que sean apropiados para amplificación de B.F. o F.I. y A.F.)
VII (blanco)	**Tiratrones** (triodos y tetrodos de atmósfera gaseosa) **diodos de cristal y transistores.**
VIII (violeta)	**Tubos de rayos catódicos** (tubos indicadores y de imagen para televisión y oscilógrafos)

MODO DE EMPLEOH

El sistema del presente manual permite tanto encontrar pronto los datos de un tipo de válvula arbitrario, como hallar fácilmente el tubo apropiado para un fin determinado, p.ej. un triodo, un conversor o un pentodo final.

En el primer caso el registro alfabético (ver pág. 308) indica la página donde se puede encontrar las propiedades deseadas. En el último caso se busca el tipo de válvula en cuestión con las propiedades deseadas en el grupo correspondiente, consultando eventualmente la tabla comparativa para ver si existe otro tubo semejante con una diferente indicación de tipo.

Por lo general se han indicado los datos característicos para las tensiones anódicas más corrientes, es decir 250 V para las válvulas que suelen emplearse en los aparatos de corriente alterna y 90 V para las válvulas alimentadas por pilas.

Se ha desviado de esta regla si

a. la tensión anódica máxima tolerada es menor de 250 V, respectivamente 90 V;
b. el fabricante del tipo de válvula en cuestión sólo ha suministrado los datos para otras tensiones.

Para las válvulas para las que puede ser importante, se han indicado los datos para dos o más tensiones anódicas diferentes. En tal caso hay un esquema de conexión completo.

Rectificadoras

Para todas las válvulas rectificadoras se han indicado la tensión alterna y la corriente continua máximas. Por lo general el punto de partida para ello ha sido el máximo absoluto de la corriente continua tolerable; en algunos casos se ha partido del máximo absoluto de la tensión alterna tolerable.

Pentodos

Del dibujo del esquema de conexión (pag. 4) puede verse, si un pentodo es apropiado para amplificación de B.F. o F.I. y A.F.:

1. Si una válvula es apropiada principalmente o únicamente para amplificación de B.F., se ha empleado un esquema de conexión según la fig. 1, con indicación de las características estáticas.
2. El esquema de conexión de la fig. 2 corresponde a las válvulas que se aplican en las etapas de F.I. y A.F. en los receptores normales.
3. El esquema de conexión de la fig. 3 sirve para los pentodos diseñados especialmente para la amplificación de ancho de banda muy grande o de frecuencias elevadísimas (aparatos de televisión y de MF) y que ya no pueden emplearse sin más en los amplificadores normales de F.I. para las frecuencias de 100 — 50 Kc/s.

Si una válvula es apropiada para regulación automática del volumen, queda marcada con las letras AVR en el punto donde puede aplicarse la tensión reguladora. El margen de regulación queda indicado por dos números detrás de la indicación "Vg_1".

Valvulas finales

Para los triodos, tetrodos y pentodos finales están indicados los ajustes corrientes de la clase A. Además se ha incluido para algunos tipos los datos de ajuste para etapas push-pull.

SIGNIFICADO DE LAS ABREVIATURAS EMPLEADAS

tensión de alimentación en voltios

a. corriente de filamento en amperios
b. corriente de ánodo y de rejilla pantalla en miliamperios

tensión de entrada en voltios (valor eficaz), respectivamente tensión alterna a rectificar

resistencia de carga en kilohmios y potencia de salida en vatios

misma válvula con indicación diferente

misma válvula con otra tensión o corriente de filamento

misma válvula con pie diferente

A	amplificación de tensión
AVR	regulación automática del volumen
d	distorsión total al valor indicado de V_o
I_a	corriente de ánodo
I_{g2}	corriente de rejilla pantalla
I_k	corriente de cátodo ($I_a + I_{g2}$)
k	kilohmio (= 1000 ohmios)
M	megohmio (= 1.000.000 de ohmios)
mA	miliamperio (= 0,001 amperio)
P_o	potencia de salida
R_a	resistencia de carga de ánodo
R_{eq}	resistencia equivalente de ruidos a la rejilla de mando
R_{g1}	resistencia de rejilla de mando
R'_{g1}	resistencia de rejilla de mando de la válvula siguiente
R_{g2}	resistencia de rejilla pantalla
R_i	resistencia interna
R_k	resistencia de cátodo
S	pendiente
S_c	pendiente de conversión
S_H	pendiente de heptodo
S_P	pendiente de pentodo
S_T	pendiente de triodo
V	voltio
V_a	tensión de ánodo
V_b	tensión de alimentación
V_g	tensión de rejilla
V_{g1}	tensión de rejilla de mando
V_{g2}	tensión de rejilla pantalla
V_o	tensión de salida
V_{omax}	tensión de salida al comienzo de la corriente de rejilla
W	vatio
$W_{a(Pa)}$	disipación de placa
μ	1. factor de amplificación 2. (condensadores) microfaradio
μA	microamperio
μ_{g2g1}	factor de amplificación de rejilla de mando con relación a la rejilla pantalla
Ω	ohmio

INTRODUÇÃO

Este manual está redigido de tal maneira, que cada um que têm de fazer com tubos-electrodos, fácil e ràpidamente pode encontrar as particularidades especiais de cada tipo de tubo. Encerra os dados mais importantes dum número grande de diversos tipos de tubos europeus e americanos para receptores e amplificadores como também de tubos de raios catódicos para aparelhos de televisão e osciloscópios e isso numa forma tal que num golpe de vista, se pode verificar as qualidades caraterísticas e as conexões aos eletrodos de cada tubo de rádio.

Isso é possível porque de cada tipo de tubo é dado um esquema de conexão, em que as correntes e tensões reinantes estão indicadas bem claras, enquanto os números dos eletrodos correspondem com a numeração do pé do tubo, também reproduzido. Além disso, o esquema da conexão é desenhado de tal maneira, que logo se pode ver a aplicação para que o tipo de tubo é destinado.

Como suplemento das propriedades caraterísticas determinadas, segundo este sistema, estão no fim de cada grupo adidas algumas tabelas com diversos dados para a colocação dum certo número de tubos, especialmente apropriados para a aplicação de amplificador de tensão ligado por resistência e capacidade. Além disso está adida, para cada grupo, uma tabela de comparação concernente aos tipos de tubos que, ou sendo completamente iguais, ou aos que sòmente mostram diferenças em relação à tensão e corrente de filamento ou do pé do tubo. Uma tabela de comparação contendo as indicações de tipo usadas pelas instâncias militares, está adida no fim deste livro (pág. 302).

Também os dados de tiratrons, tubos de raios catódicos e um número de diodes de cristal e transistores estão adidos em forma de tabelas.

Os diversos tipos de tubos estão classificados em 8 grupos principais, do que cada um fica marcado por uma fita de côr, como segue:

I (Côr de laranja)	**Diodos** (Retificadores e detetores)
II (Verde)	**Triodos** (entre os quais triodos dobres e diodos dobres-triodos)
III (Amarela)	**Tetrodos e pentodos** (entre os quais também diodos dobres-pentodos)
IV (Azul)	**Tubos de potência** (triodos, tetrodos, pentodos)
V (Cinzenta)	**Conversores de freqüência**, os chamados tubos de mistura, tais como hexodos, heptodos, octodos, sim ou não combinados com triodo oscilador
VI (Vermelha)	**Tubos de combinação** (triodos-pentodos e semelhantes; triodos-heptodos emquanto estes servem para a amplificação de b.f. (baixa freqüência), ou m.f. (média freqüência) e r.f. (radiofreqüência).
VII (Branca)	**Tiratrons** (triodos e tetrodos) **diodos de cristal e transistores**
VIII (Roxa)	**Tubos de raios catódicos** (tubos indicadores, tubos de imagem para televisão e osciloscópios).

MODO DE USAROL

O sistema da disposição deste manual faz possível que se pode achar numa maneira rápida, tanto os dados dum tipo de tubo arbitrário como também os dum tipo próprio para um fim determinado — por exemplo tanto um triodo, um retificador como um tubo pentodo de potência.

No primeiro caso o registro alfabético (veja pág. 308) indica as páginas em que pode encontrar as qualidades. No segundo caso procura-se o tipo de tubo com as qualidades exigidas no grupo concernente, depois de que se pode verificar a tabela de comparação, pertencente a este grupo, para ver se haja talvez ainda um tubo semelhante sob outra indicação de tipo.

Em geral só estes dados caraterísticos estão mencionados que correspondem às tensões anódicas mais usuais, isso quer dizer 250 V para os tubos que se aplicam geralmente nos aparelhos de corrente alternativa e 90 V para os de alimentação de baterias.

Disso se desvia quando:

a. a tensão anódica máxima permitida é menos do que 250 V, respectivamente 90 V;
b. se o fabricante só indicou os dados das tensões alteradas do tipo de tubo concernente.

Além disso, para os tubos de que é duma importância especial, indicam-se os dados para duas ou mais tensões anódicas diferentes, para estes casos encontra-se neste livro um esquema de conexão completo.

Retificadores

Dos tubos retificadores sempre está indicada uma combinação de tensão alternativa máxima e de corrente contínua máxima, geralmente baseada no máximo absoluto da corrente contínua admitida. Em alguns casos tomou-se como ponto de partida o máximo absoluto da tensão alternativa.

Pentodos

Se um pentodo seja usuável para amplificação de b.f. (baixa freqüência), ou m.f. (média freqüência) e r.f. (radiofreqüência), isso será indicada pelo sistema de desenho da conexão, como segue (veja pág. 4):

1. Sendo o tubo principal ou exclusivamente apto para b.f., então se usou um esquema de conexão conforme à figura 1, mencionando as caraterísticas estáticas.
2. Para tubos que se aplicam nas etapas de m.f. e r.f. de receptores de radiodifusão normais, vale o esquema de conexão da figura 2.
3. Pentodos especialmente projetados para a amplificação de recepção de grande largura de banda ou de freqüências muito altas (aparelhos de TV e F.M.) e que não podem ser aplicados sem mais nos amplificadores normais para freqüências médias de 100 — 500 kHz, estão caraterizados por um esquema de conexão segundo a figura 3.

Se um tubo seja apto para a aplicação de regulação automática da amplificação, então es letras AVR estão colocadas no ponto onde a tensão de regulação pode ser aplicada. Além disso a margem de regulação está indicada por dois números atraz "Vg_1".

Tubos terminais

Dos tubos de potência, triodos, tetrodos e pentodos, estão dados os ajustes usuais de classe A. Para um certo número de tipos também estão adidos os dados para as etapas push-pull.

EXPLICAÇÃO DOS SIMBOLOS E ABREVIAÇÔES USADOS

Tensão de alimentação em vóltios

a. corrente de filamento em ampérios
b. corrente de ânodo e de screen-grid em miliampérios

tensão de signal em voltios (valor eficaz), respectivamente
tensão alternativa a retificar

resistência de carga em quilohm e potência de saida em watt.

o mesmo tubo com outra indicação de tipo

o mesmo tubo com outra tensão e/ou corrente de filamento

o mesmo tubo com outro pé.

A	amplificador de tensão
AVR	regulação automática de amplificação
d	distorsão total no valor indicado de V_o
I_a	corrente de ânodo
I_{g2}	corrente de screen-grid
I_k	corrento de catodo ($I_a + I_{g2}$)
k	quilohm (= 1.000 ohm)
M	megohm (= 1.000.000 ohm)
mA	miliampère (= 0,001 ampère)
P_o	potência de saída
R_a	resistência de carga de ânodo
R_{eq}	resistência de ruido equivalente à grelha de comando
R_{g1}	resistência de grelha de comando
R'_{g1}	resistência de grelha de comando do tubo seguinte
R_{g2}	resistência de screen-grid
R_i	resistência interna
R_k	resistência de cátodo
S	inclinação
S_c	inclinação de conversão
S_H	inclinação de heptodo
S_P	inclinação de pentodo
S_T	inclinação de triodo
V	vóltio
V_a	tensão de ânodo
V_b	tensão de alimentação
V_g	tensãao de grelha
V_{g1}	tensão de grelha de comando
V_{g2}	tensão de screen-grid
V_o	tensão de saida
V_{omax}	tensão de saida ao limite da corrente de grelha
W	watt
$W_{a\,(Pa)}$	dissipação anódica
μ	1. fator de amplificação. 2. tratando-se dum condensador: microfarad
μA	micro-ampère
μ_{g2g1}	fator de amplificação de grelha de comando em respeito à screen-grid
Ω	ohm

USO DEL MANUALE

Questo manuale è compilato in maniera tale che chiunque abbia a che fare, in pratica, con le valvole elettroniche, possa trovare facilmente e rapidamente tutti i dati di un qualsiasi tipo di valvola.

Esso contiene i dati più importanti e le caratteristiche tecniche principali di un grandissimo numero di valvole a caratteristica europea e a caratteristica americana, per radioricevitori ed amplificatori; sono riportati anche i dati riguardanti i tubi a raggi catodici per televisori e per oscillografi, il tutto presentato in una forma che permette di rilevare le caratteristiche ed i collegamenti agli elettrodi, a prima vista.

Quanto sopra è stato reso possibile con la pubblicazione, per ogni valvola, di uno schemino riproducente l'impiego della valvola stessa: sullo schema sono chiaramente indicati i valori delle correnti e delle tensioni e, accanto agli elettrodi, si trovano i numeri indicativi reperibili poi sulla zoccolatura anch'essa disegnata.

Oltre a questo, lo schema è stato redatto in modo da rendere immediatamente evidente per quale applicazione quel dato tipo di valvola è stato progettato.

Per completare le caratteristiche tecniche esposte con questo sistema, dietro di ogni gruppo si trovano diverse tabelle contennenti ulteriori dati d'impiego per un certo numero di valvole che si prestano in modo particolare al montaggio come amplificatrici di tensione con accoppiamento a resistenzacapacità. Infine, viene riprodotta una tabella, per ogni gruppo, comparativa dei tipi di valvole che corrispondono tra loro esattamente o che offrono leggere differenze dovute ad esempio alla sola tensione o corrente di accensione, o ancora ad una zoccolatura diversa.

Nelle ultime pagine del manuale Vi è poi un'altra tabella: riproduce l'equivalenza tra la classificazione militare e quella più nota, commerciale (pag. 302). Sempre sotto forma di tabella sono riportati i dati di tyratron, di tubi a raggi catodici e di un certo numero di transistori diodi a cristallo, tra quelli più usati.

I vari tipi di valvola sono suddivisi in otto gruppi principali, ognuno dei quali è contraddistinto, nel libro, da una propria striscia colorata come segue:

I°)	(arancio)	**Diodi** (raddrizzatori e rivelatori)
II°)	(verde)	**Triodi** (tra i quali i doppi triodi ed i doppi diodo-triodo)
III°)	(giallo)	**Tetrodi e pentodi** (tra i quali i doppi diodi-pentodi)
IV°)	(bleu)	**Valvole di potenza** (triodi, tetrodi, pentodi)
V°)	(grigio)	**Convertitori di frequenza** (valvole mescolatrici quali gli exodi, eptodi, octodi, con o senza triodo oscillatore)
VI°)	(rosso)	**Valvole multiple** (triodi-pentodi ecc.; triodi-eptodi in quanto impiegabili per applicazioni di B. F., Media Frequenza e A. F.).
VII°)	(bianco)	**Tyratron** (triodi e tetrodi in atmosfera gassosa) **diodi a cristallo e transsistori.**
VIII°)	(viola)	**tubi a raggi catodici** (indicatori di sintonia e tubi per visione TV ed oscillografia).

Impiego:

La classificazione seguita per questo libro rende possibile il reperire, come si è detto, rapidamente i dati concernenti un determinato tipo di valvola, ma permette altresì di individuare la valvola più

indicata — per esempio un triodo, una raddrizzatrice o un pentodo di potenza — per un determinato impiego.

Nel primo caso, l'indice alfabetico (vedi pag. 308) rinvia alla pagina dove si trovano i dati che interessano. Nel secondo caso si cerca la valvola che risponde alle necessità, scorrendo il gruppo di classificazione (vedi colore). In seguito si può consultare anche la tabella comparativa che si riferisce a quel dato gruppo e accertare se esiste eventualmente un'altra valvola analoga con diversa indicazione di tipo.

Le caratteristiche riportate sono quelle ricavate, in generale, sulla base delle tensioni anodiche più correnti e cioè 250 volt per le valvole correntemente impiegate nelle apparecchiatura a corrente alternata e 90 volt per quanto si riferisce alle valvole previste per l'alimentazione con batterie. Abbiamo fatto però eccezione a questa regola nel caso specifico in cui:

a) la tensione anodica massima ammissibile è inferiore ai citati 250 e 90 volt;
b) la casa costruttrice della valvola in questione indica solamente i dati riferiti ad una particolare tensione diversa.

Inoltre, per determinate valvole per le quali tali dati risultano di una particolare importanza, sono riprodotte le caratteristiche riferite a due o più tensioni anodiche e, in questi casi, è sempre riprodotto lo schema completo dei collegamenti.

Raddrizzatrici

Per le valvole raddrizzatrici viene indicata la tensione alternata massima e la corrente continua massima; tali valori sono basati generalmente sul massimo assoluto della corrente continua ammissibile.

In qualche caso viene preso come punto di partenza il massimo assoluto della tensione alternata.

Pentodi

Il sistema adottato per il disegno delle connessioni permette, secondo il sistema che ora spieghiamo, di rilevare se un pentodo è previsto per l'amplificazione in B. F. o in Media Frequenza o in A. F. (Vedi pag. 4).

1). Se la valvola è principalmente ed esclusivamente prevista per l'impiego di amplificazione B. F., lo schema è del tipo di cui alla figura 1, che indica le caratteristiche statiche.
2). Lo schema di figura 2 invece è seguito per le valvole che trovano applicazione negli stadi di A. F. e di Media Frequenza dei ricevitori normali per radiodiffusione.
3). I Pentodi previsti per il particolare impiego di amplificazione a banda larga o di frequenze molto elevate (televisori e ricevitori a modulazione di frequenza) e che comunque non possone essere adottati negli amplificatori per frequenze abituali dai 100 ai 500 kHz, sono rappresentati secondo lo schema di connessione di cui alla figura 3.

Quando una valvola è adatta all'aplicazione della regolazione automatica di amplificazione, il punto al quale può essere applicata la tensione regolatrice viene indicato con la sigla AVR. In più, viene riportato il campo di regolazione indicandolo nei due valori dopo la dicitura „V_{g1}"

Valvole di potenza

Per le valvole di potenza, sia per i triodi che per i tetrodi che per i pentodi, viene preso in esame il regime di funzionamento abituale in classe A. Per certi tipi sono riportati anche i valori per l'impiego in „push-pull".

SPIEGAZIONE DEI SIMBOLI E DELLE ABBREVIAZIONI USATE

tensione di alimentazione in Volt.

a. corrente di riscaldamento in Ampere.
b. corrente anodica e di griglia schermo in milli Ampere.

tensione di segnale in Volt (valore effettivo) resp. tensione alternata da raddrizzare.

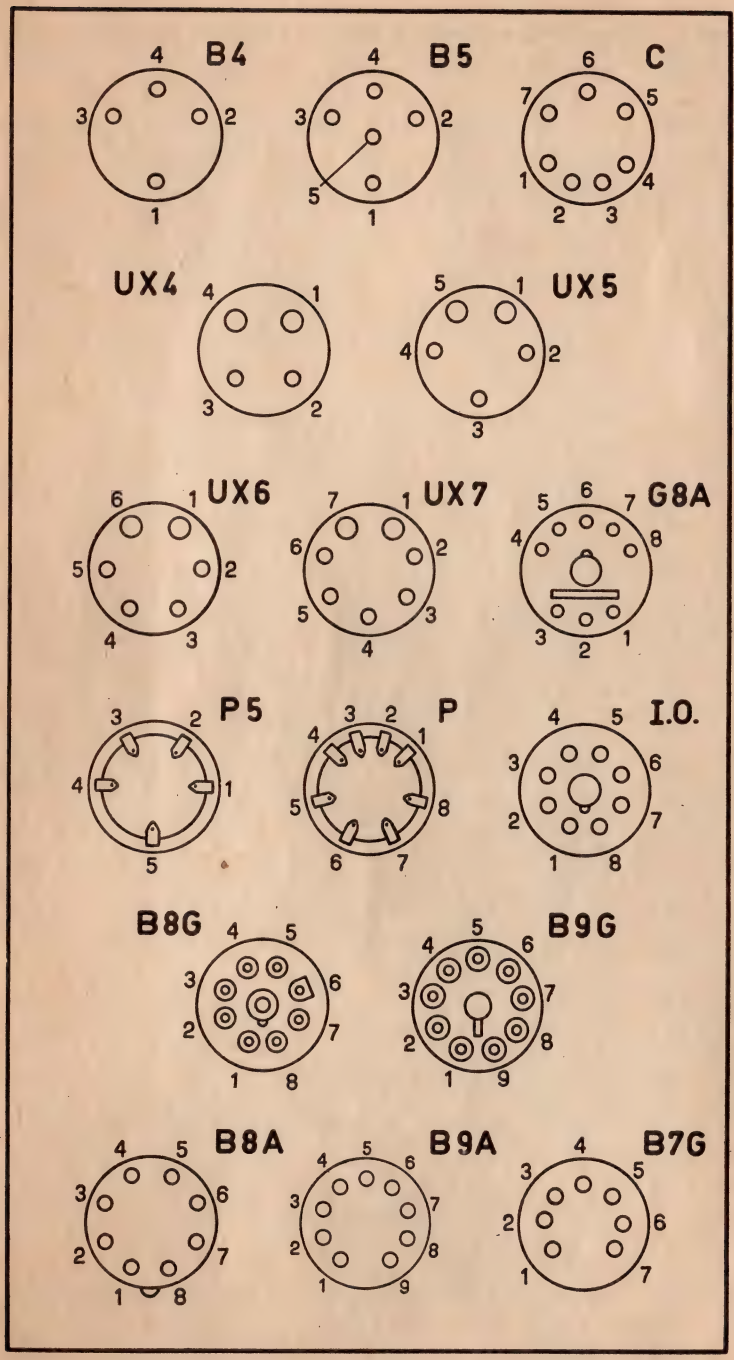
resistenza di carico in Kohm e potenza d'uscita in Watt.

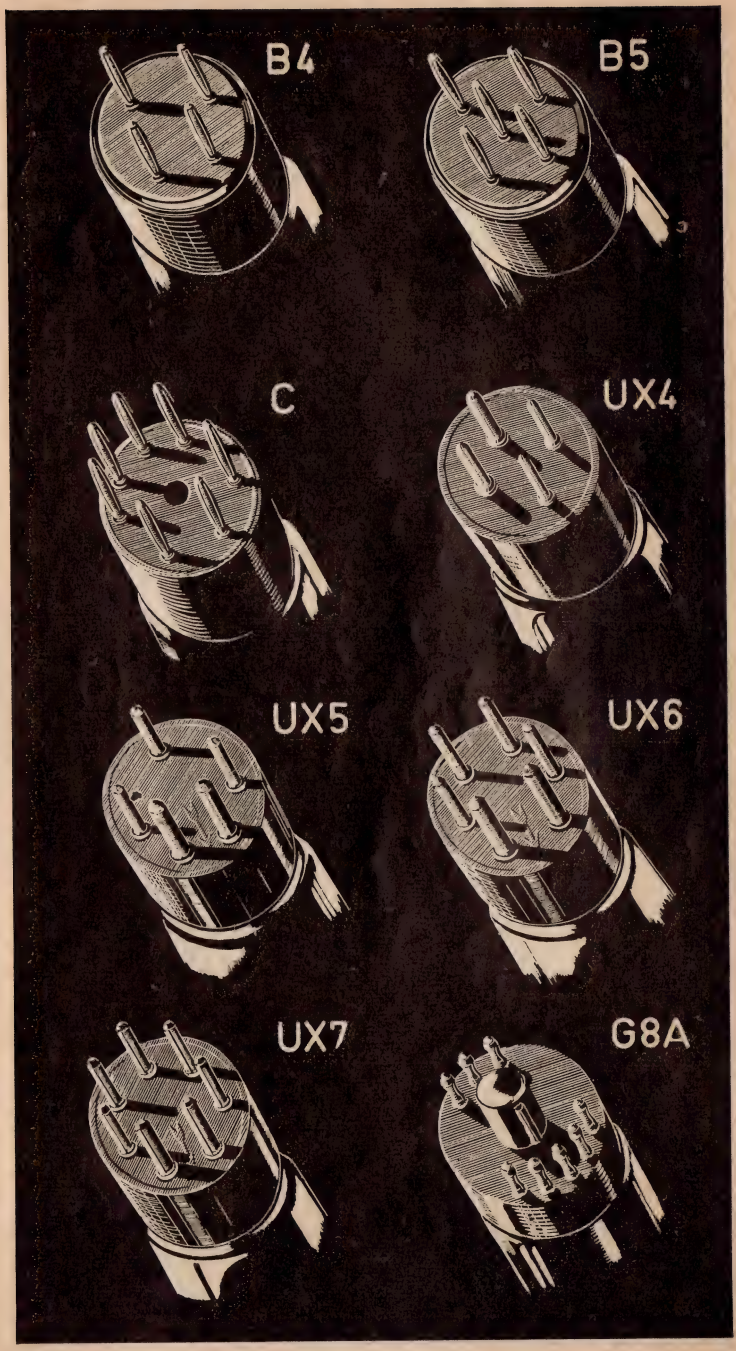
la stessa valvola con un'altra indicazione del tipo.

la stessa valvola ma altra tensione e/o corrente di riscaldamento.

la stessa valvola ma con altra zoccolatura

A	amplificazione di tensione
AVR	regolazione automatica di volume.
d	distorsione totale con valore dato di Vo.
I_a	corrente anodica
I_{g2}	corrente di griglia schermo
I_k	corrente catodica ($I_a + I_{g2}$)
k	Kohm (1000 ohm)
M	Mohm (1000.000 ohm)
mA	milliampere (0,001 ampere)
P_o	potenza d'uscita
R_a	resistenza di carica anodica
R_{eq}	resistenza equivalente di rumore alla griglia di comando.
R_{g1}	resistenza di griglia di comando
R'_{g1}	resistenza di griglia di comando della prossima valvola
R_{g2}	resistenza di griglia schermo
R_i	resistenza interna
R_k	resistenza catodica
S	pendenza
S_c	pendenza di conversione
S_H	pendenza di heptodo
S_P	pendenza di pentodo
S_T	pendenza di triodo
V	volt
V_a	tensione anodica
V_b	tensione di alimentazione
V_g	tensione di griglia
V_{g1}	tensione di griglia di comando
V_o	tensione di uscita
V_{omax}	tensione di uscita al cominciamento della corrente di griglia
W	watt
$W_a(P_a)$	dissipazione anodica
μ	1. coefficiente d'amplificazione 2. con condensatore: microfarad
μA	micro-ampere
μ_{g2g1}	coefficiente d'amplificazione della griglia di comando a riguardo alla griglia schermo
Ω	ohm


B4
B5
C
UX4
UX5
UX6
UX7
G8A
P5
P
I.O.
B8G
B9G
B8A
B9A
B7G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B5
C
UX4
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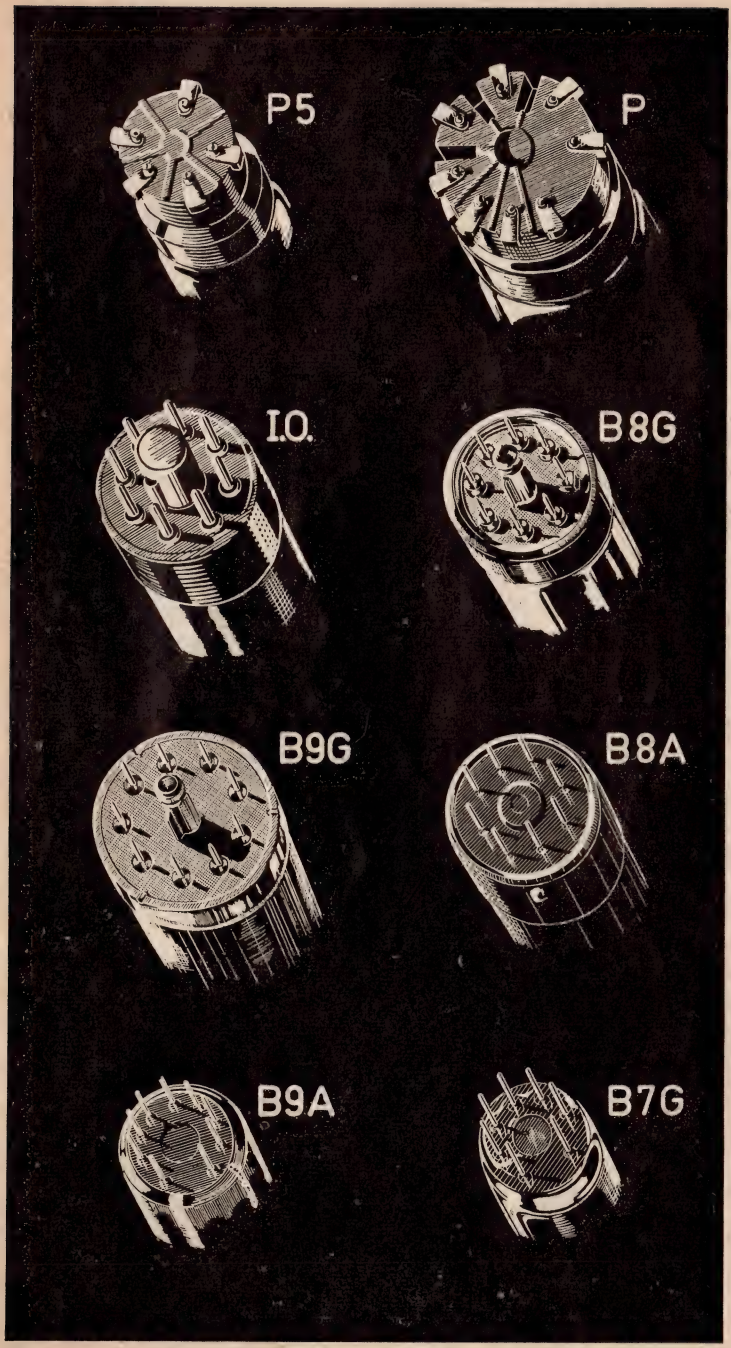
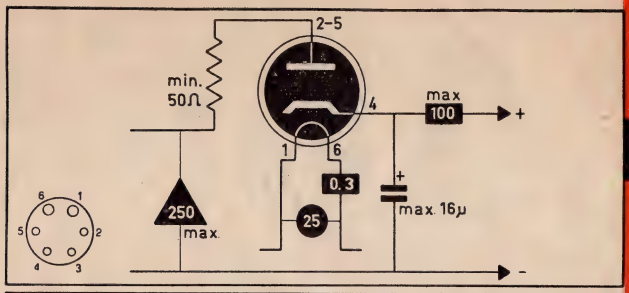
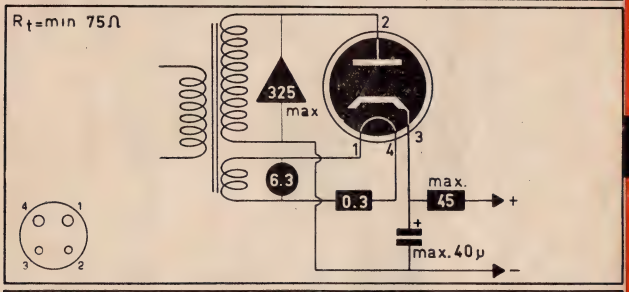
UX6
UX7
G8A

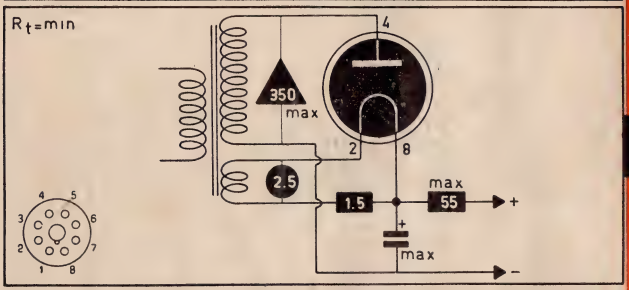

P5
P
I.O.
B8G
B9G
B8A
B9A
B7G



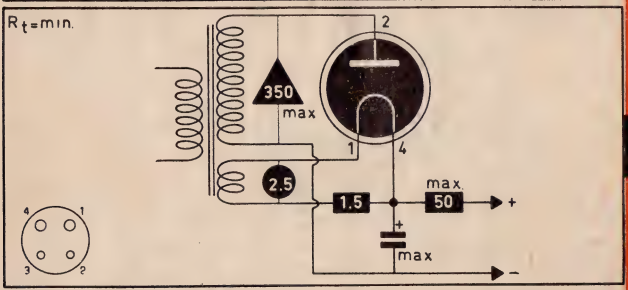
1D6



1V



2W3



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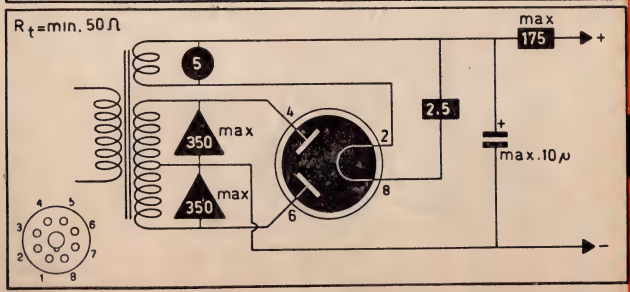

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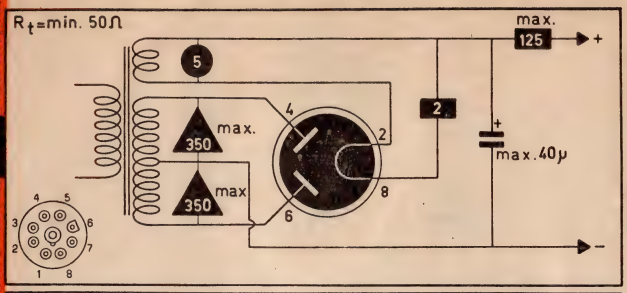

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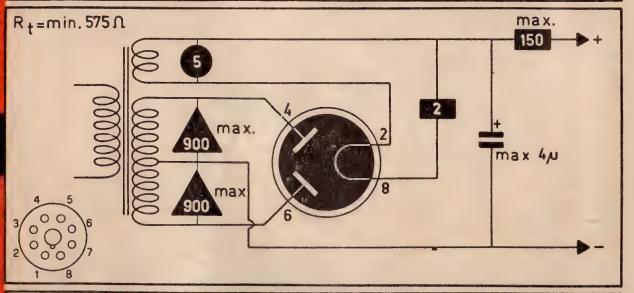

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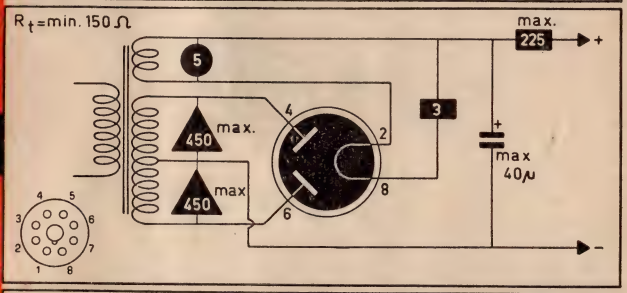

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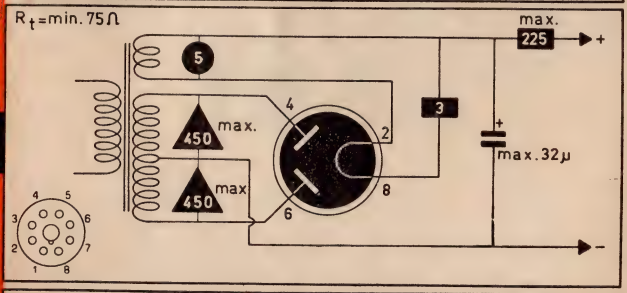

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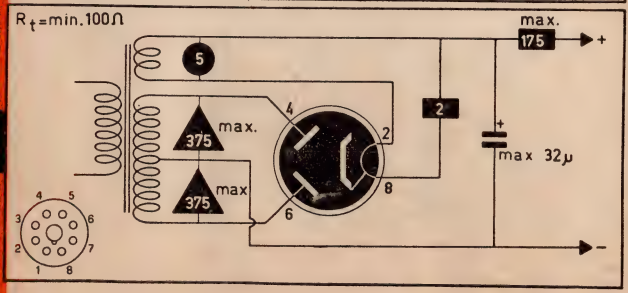

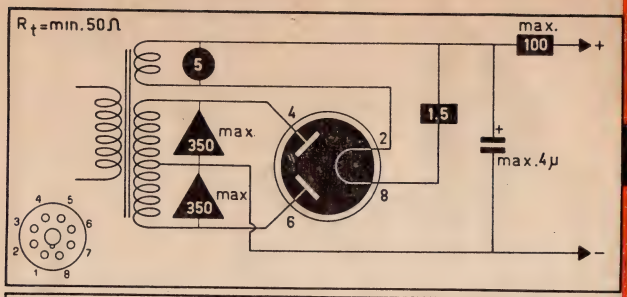

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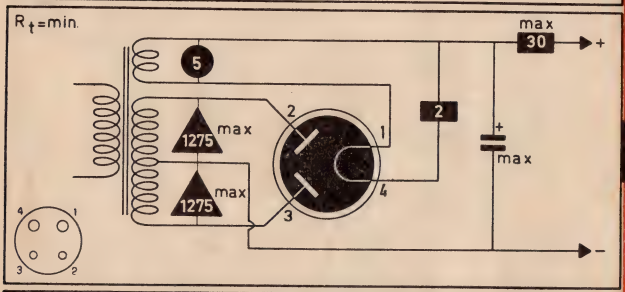

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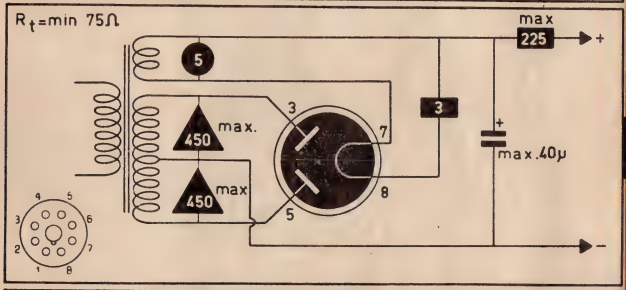

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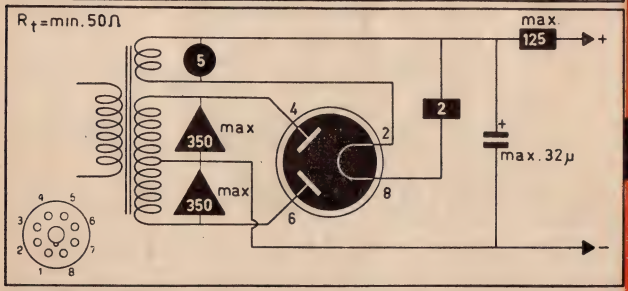

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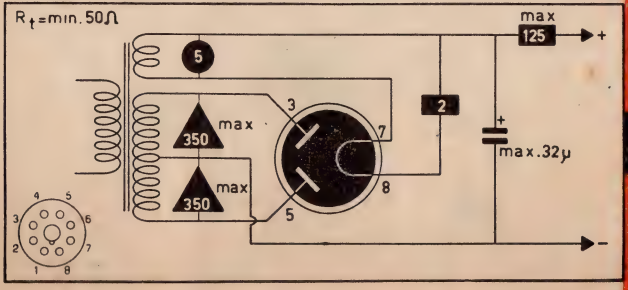

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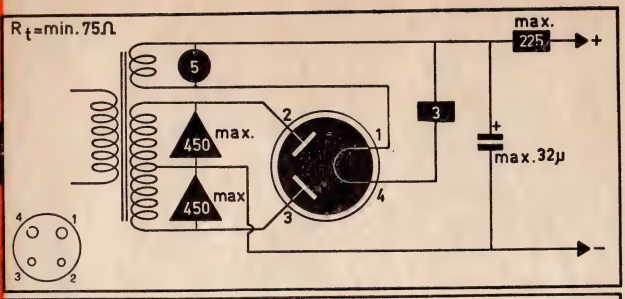

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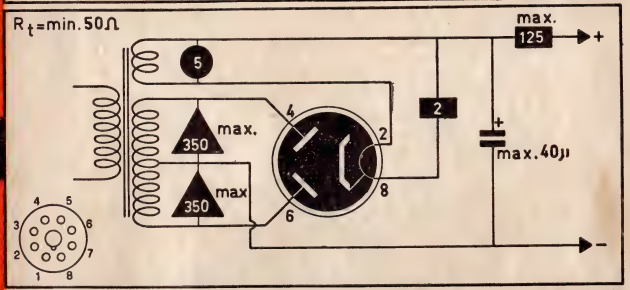

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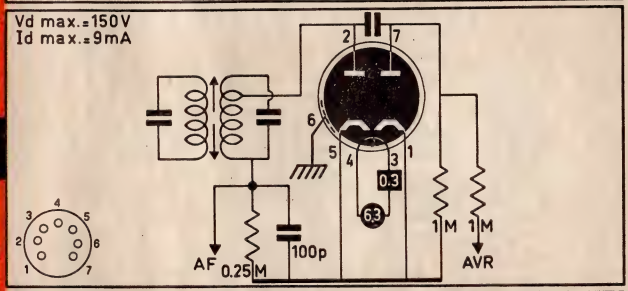

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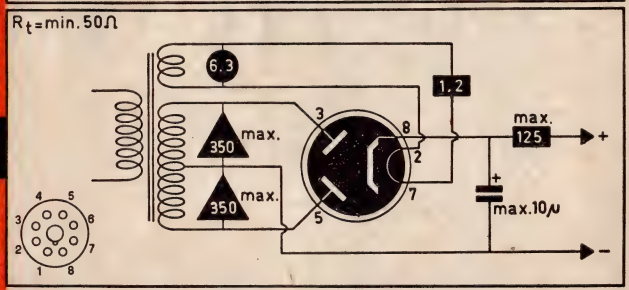

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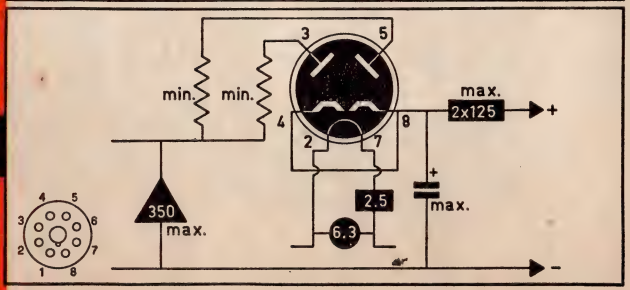

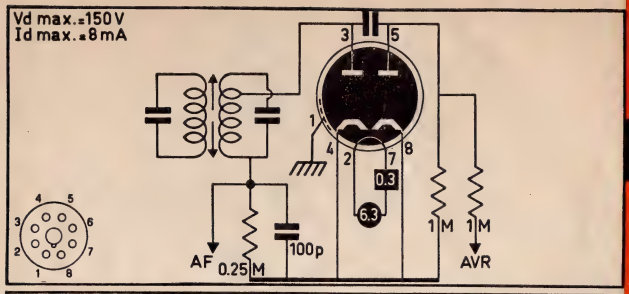

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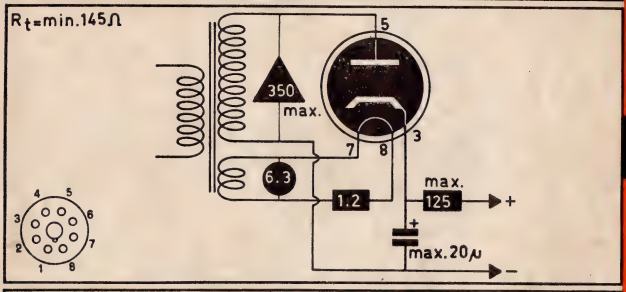

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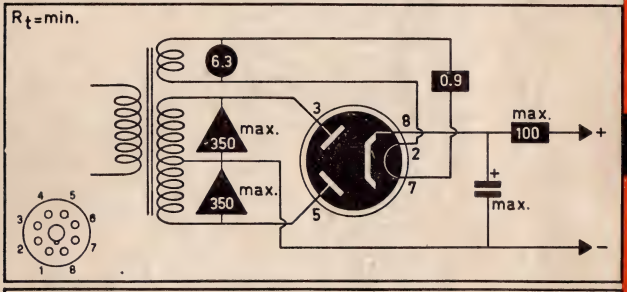

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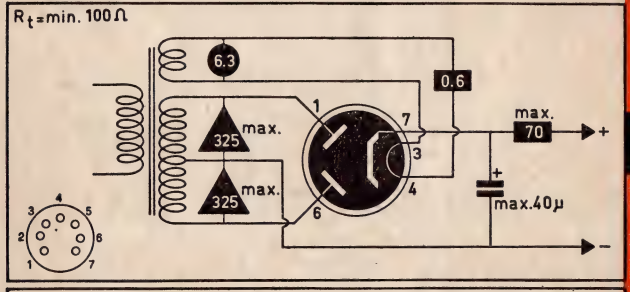

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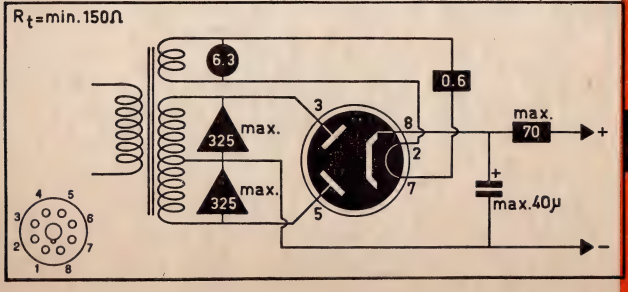

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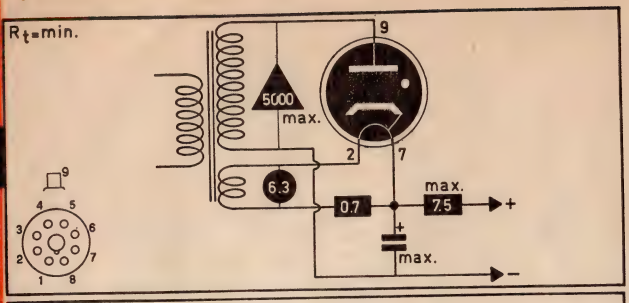

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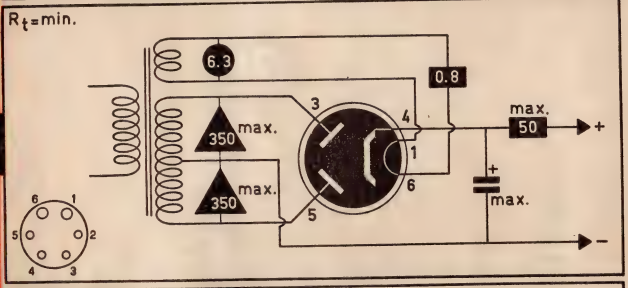

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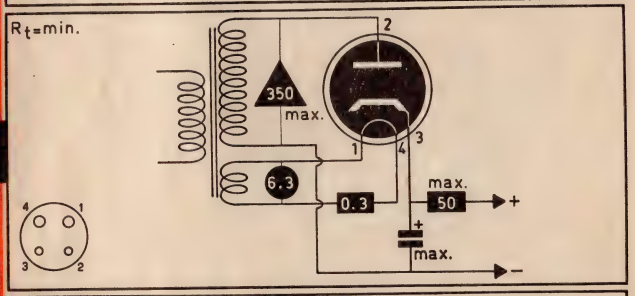

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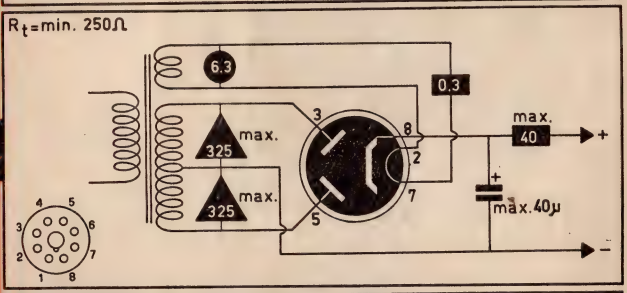

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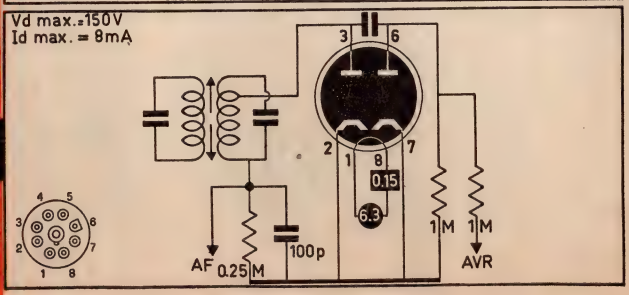

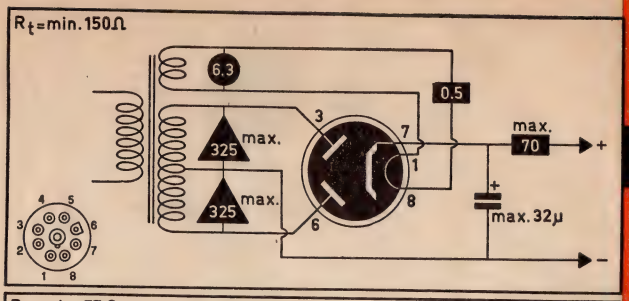

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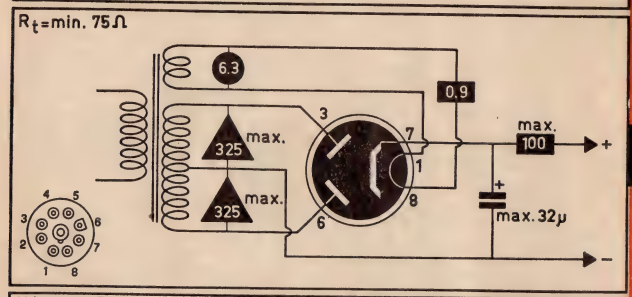

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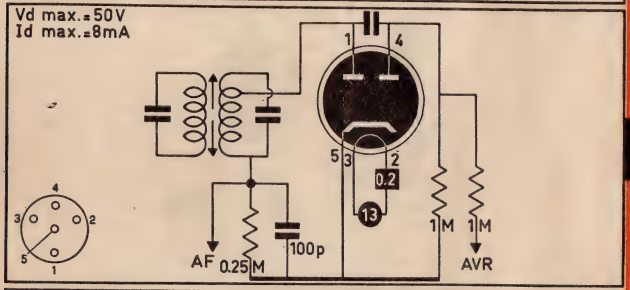

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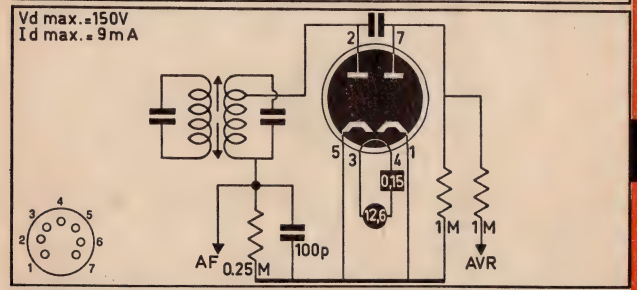

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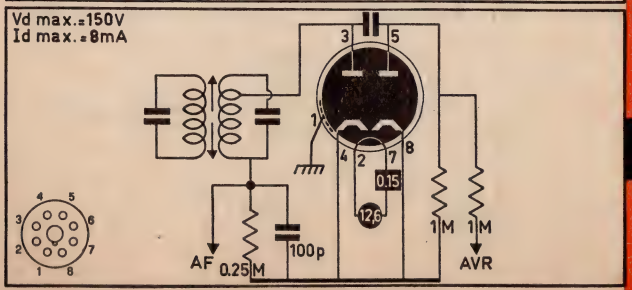

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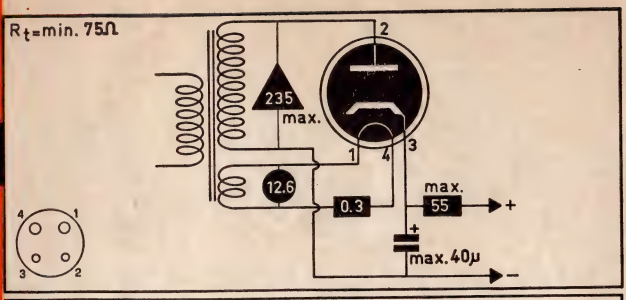

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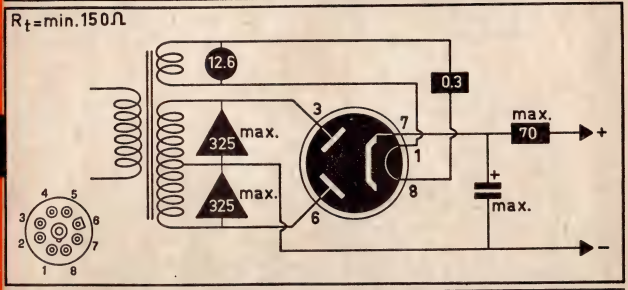

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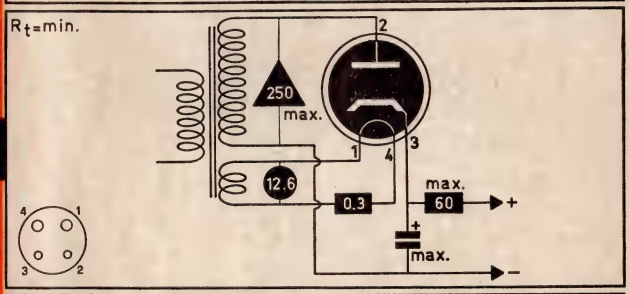

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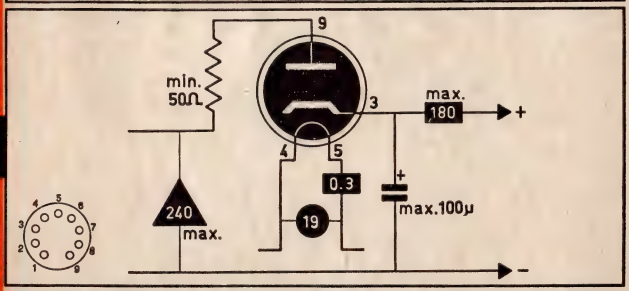

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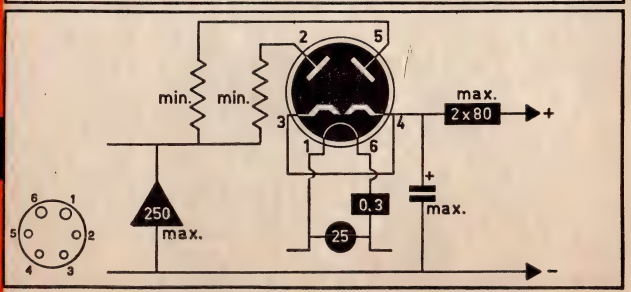

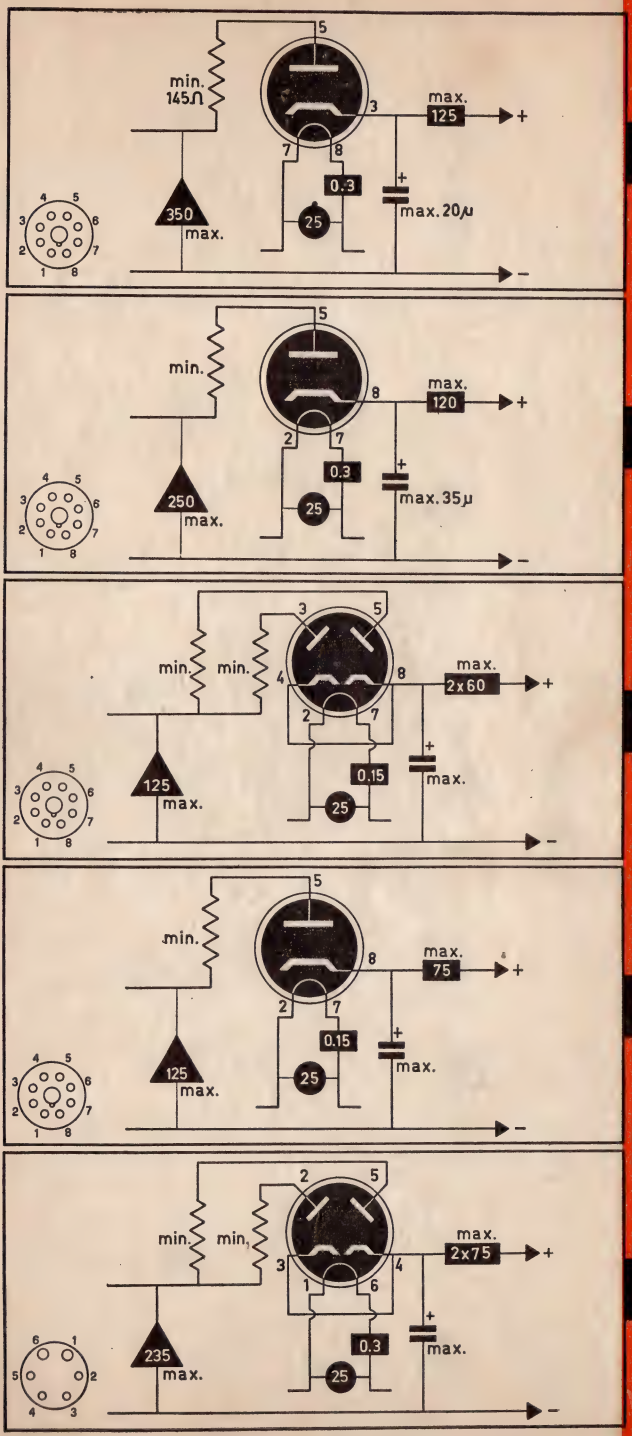
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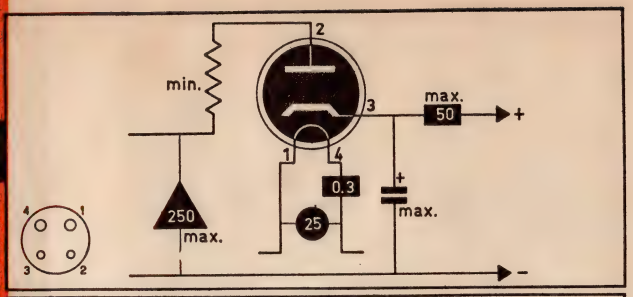

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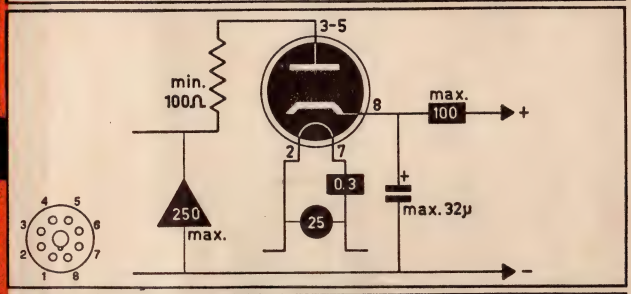

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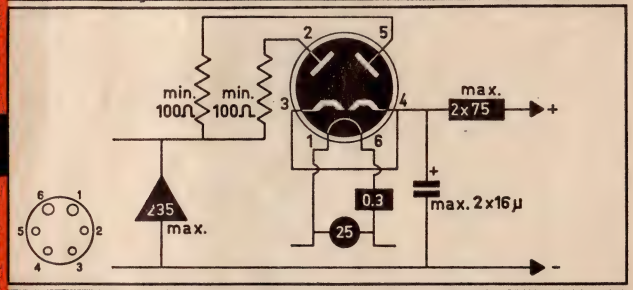

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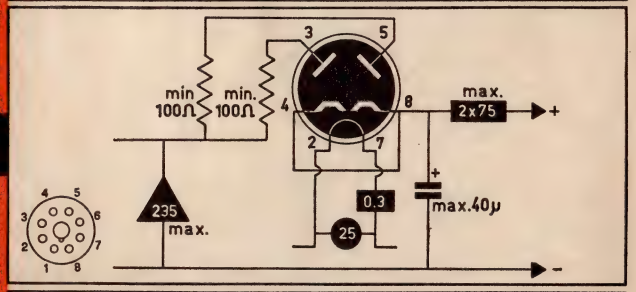

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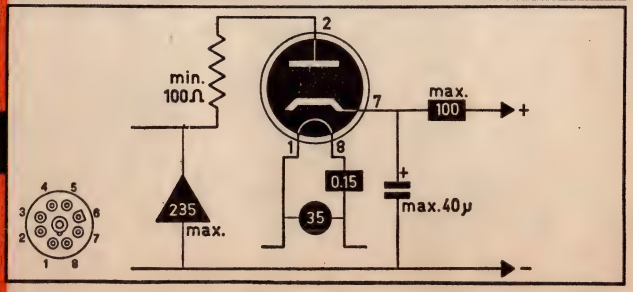

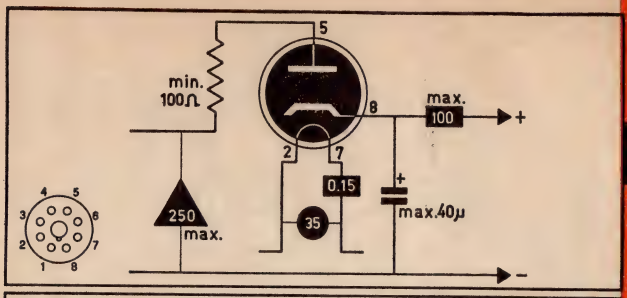

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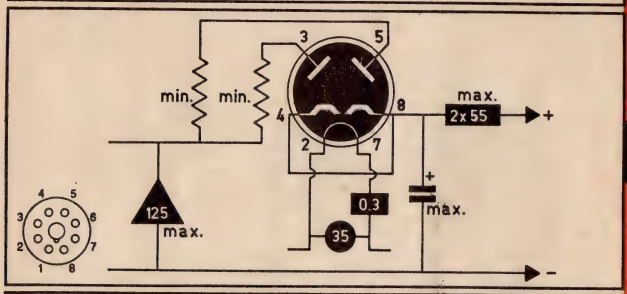

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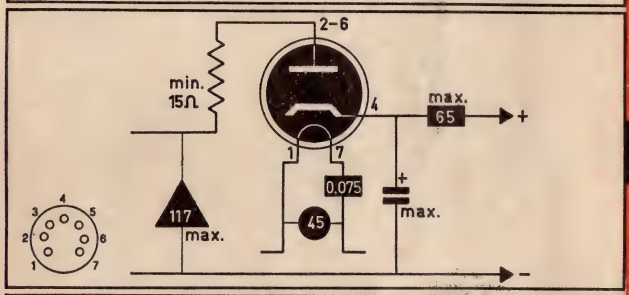

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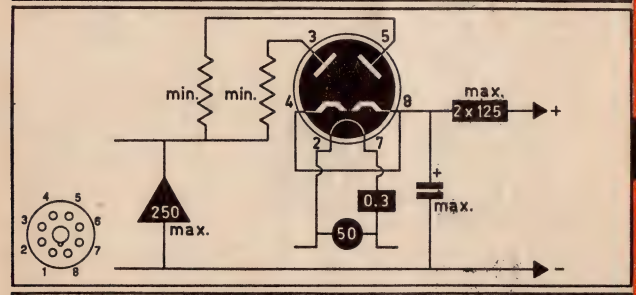

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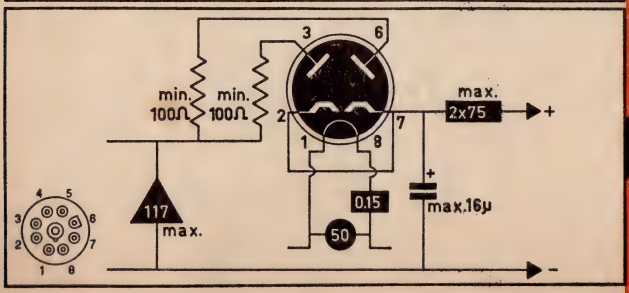

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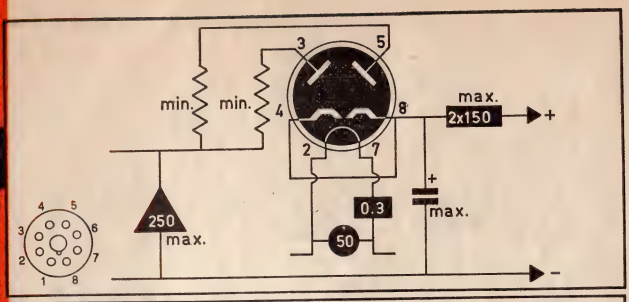

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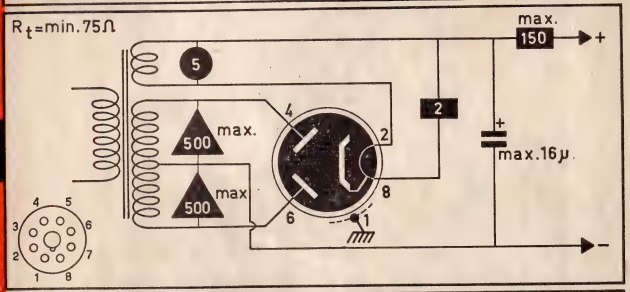

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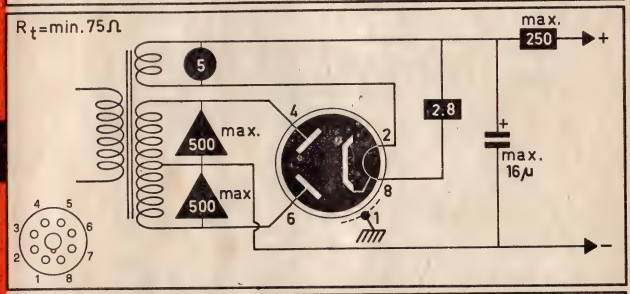

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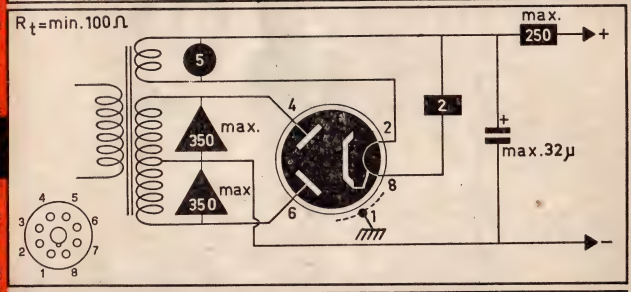

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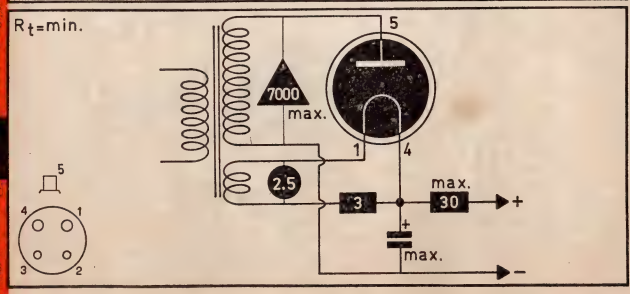

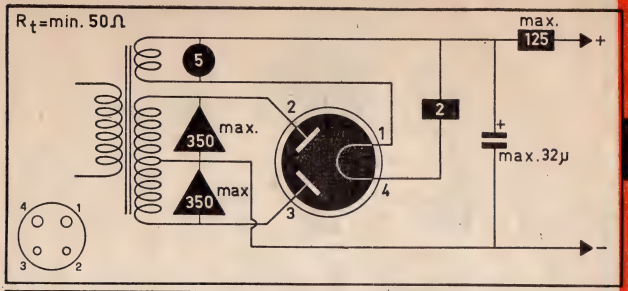

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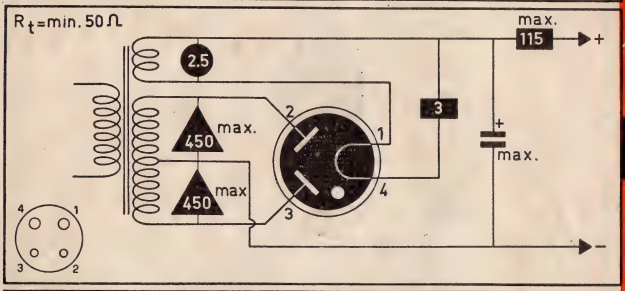

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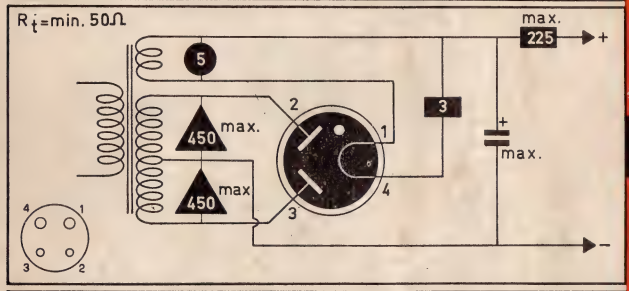

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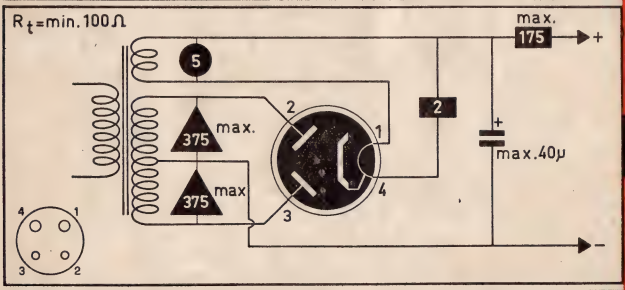

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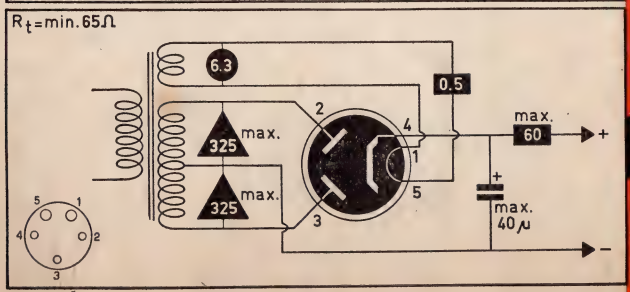

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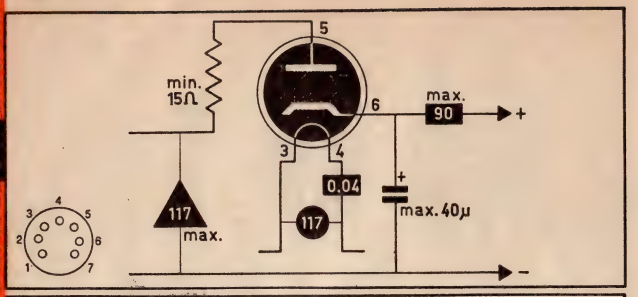

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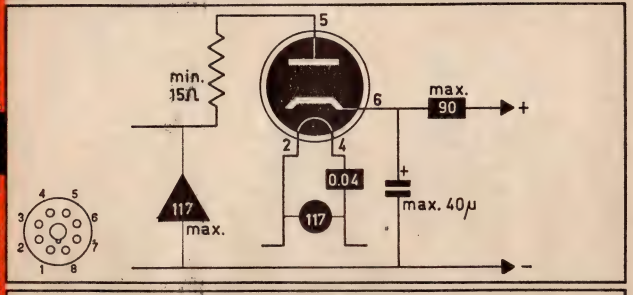

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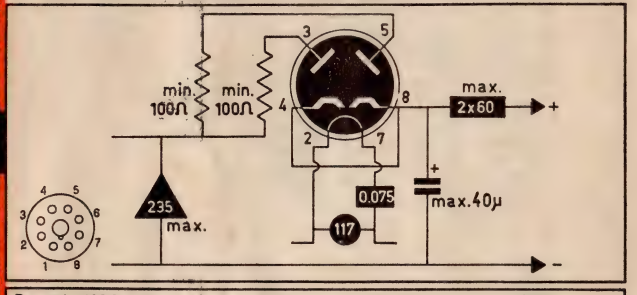

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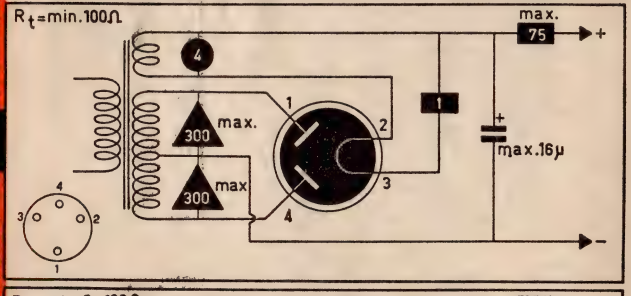

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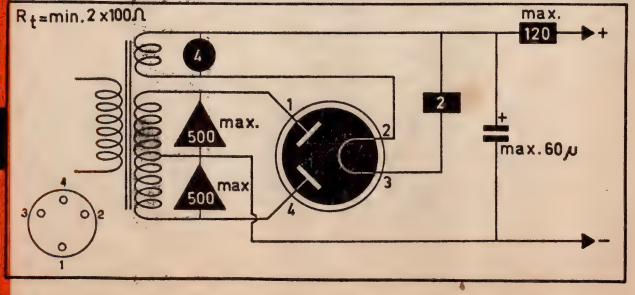

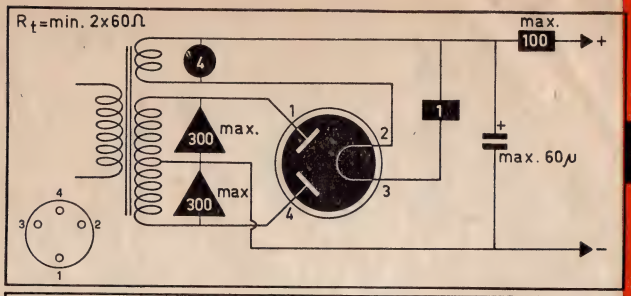

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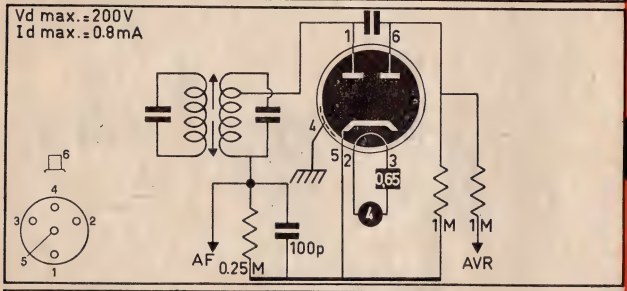

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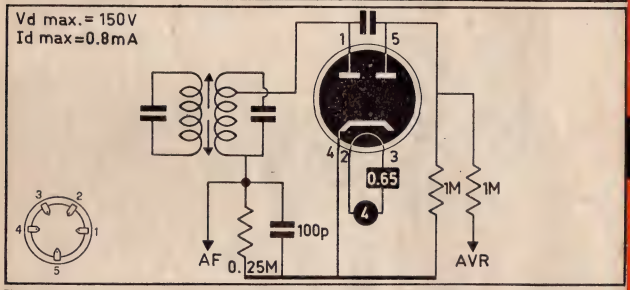

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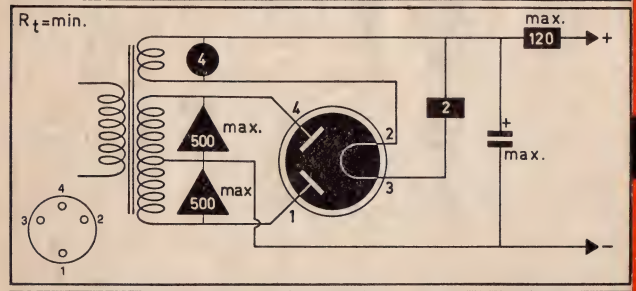

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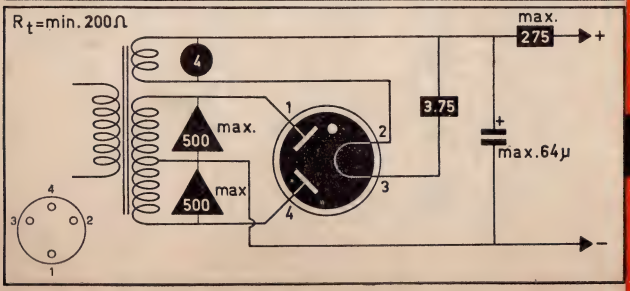

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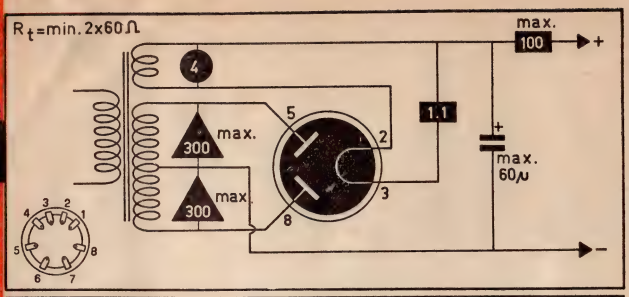

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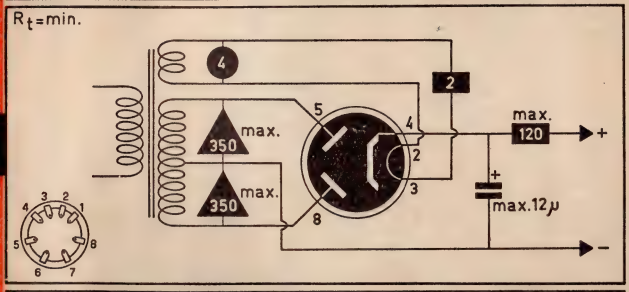

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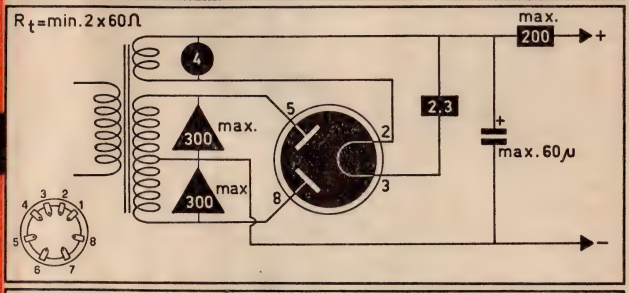

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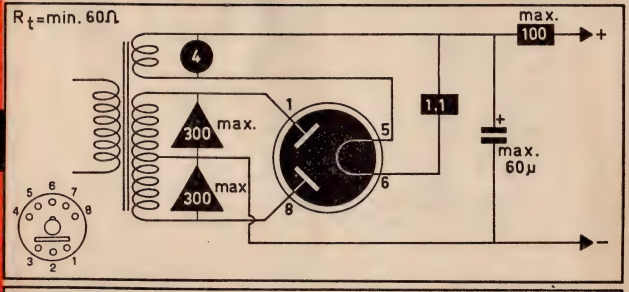

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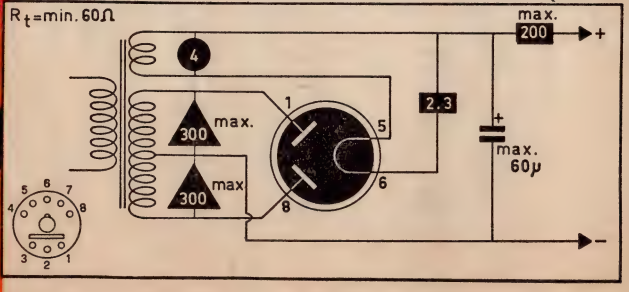

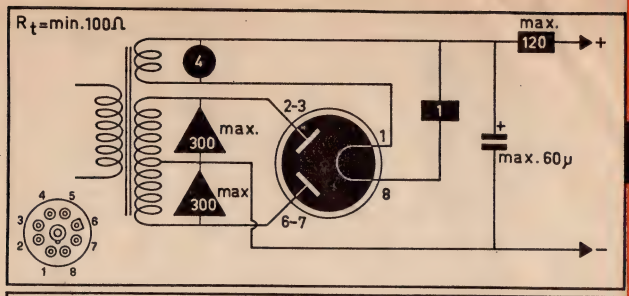

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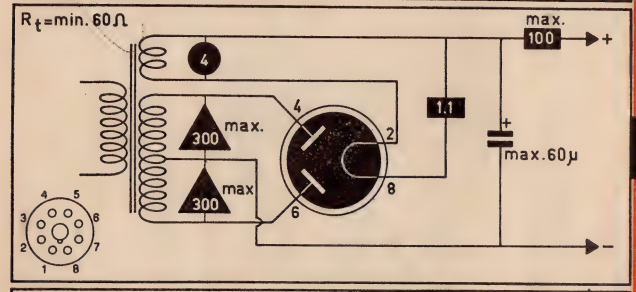

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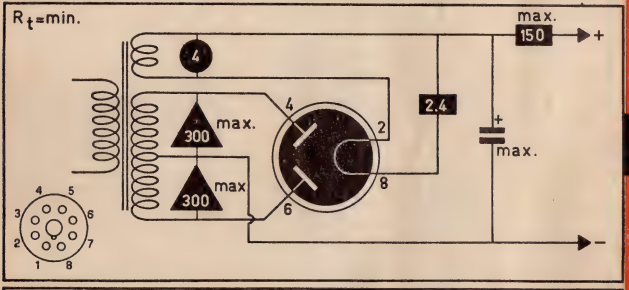

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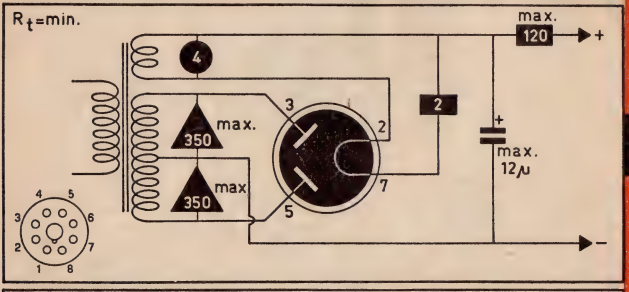

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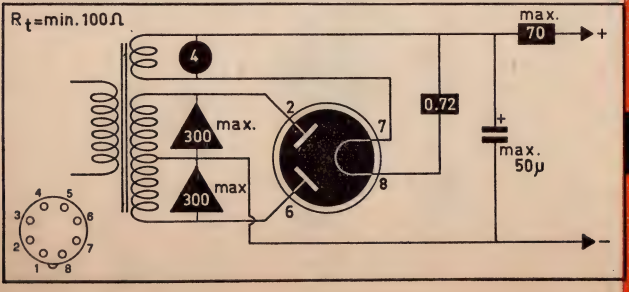

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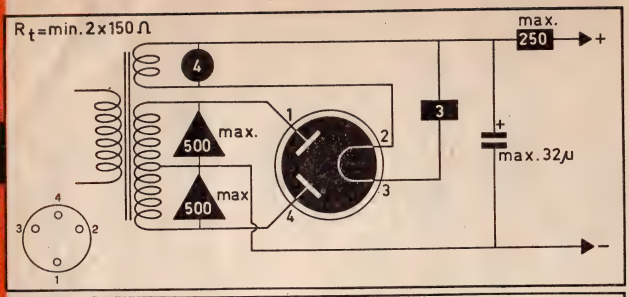

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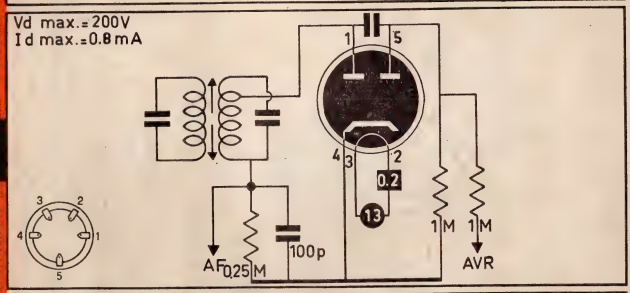

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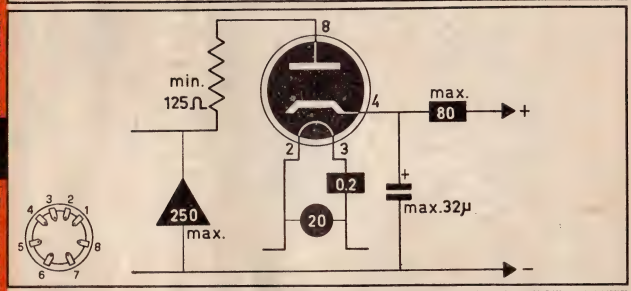

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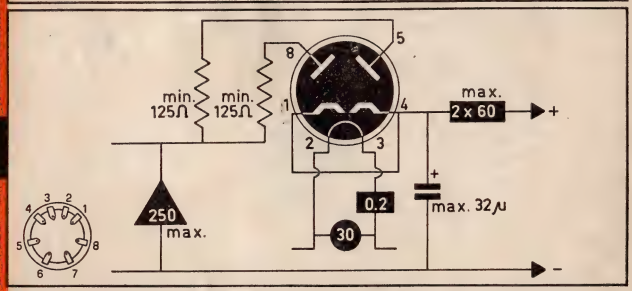

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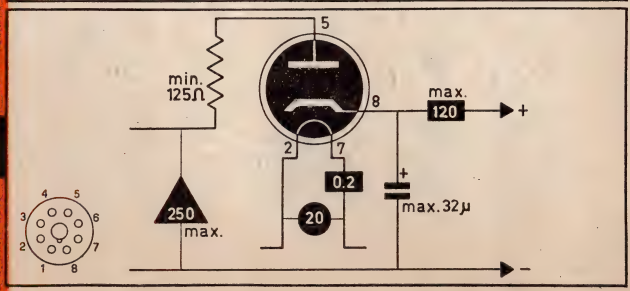

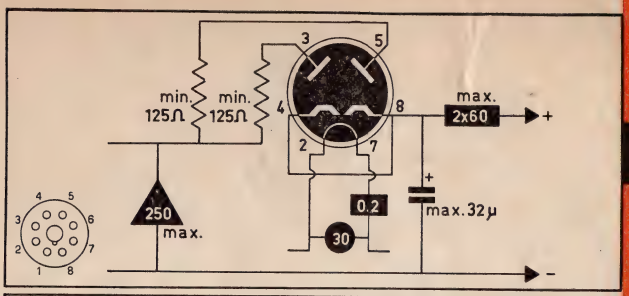

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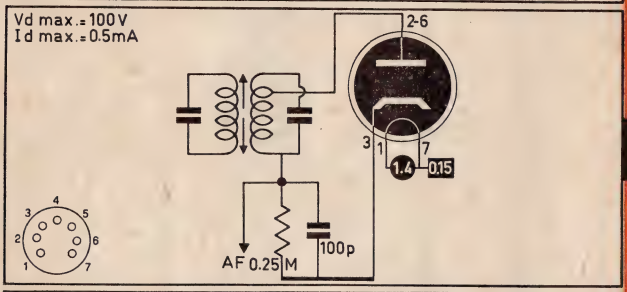

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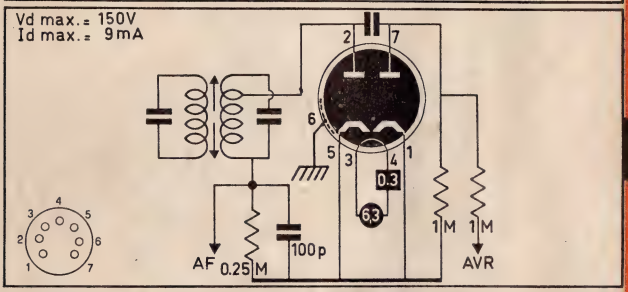

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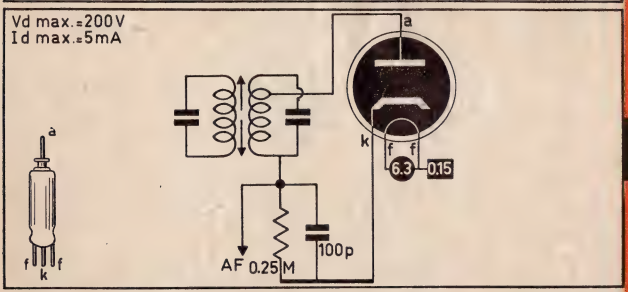

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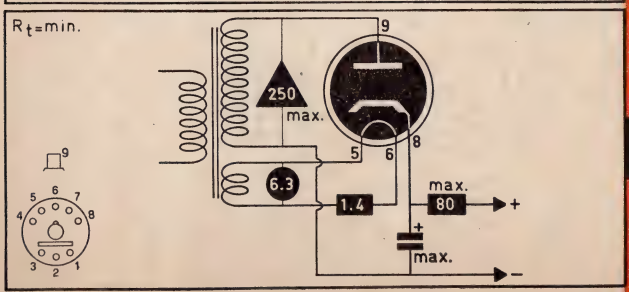

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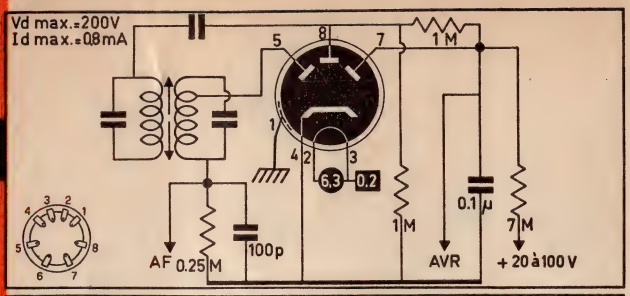

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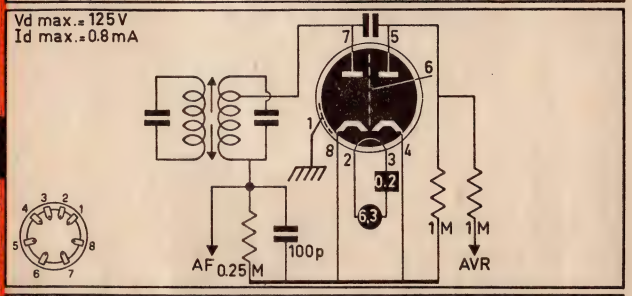

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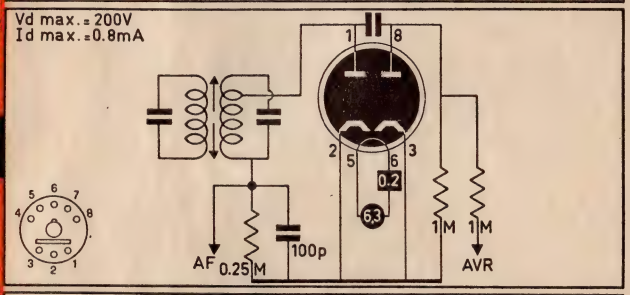

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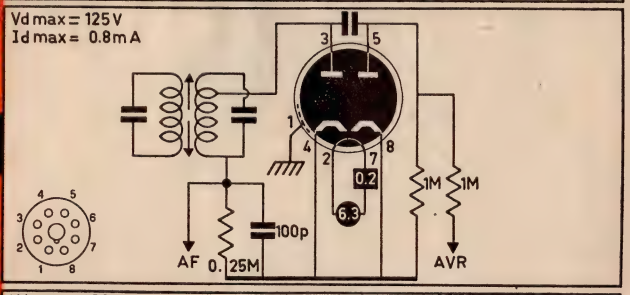

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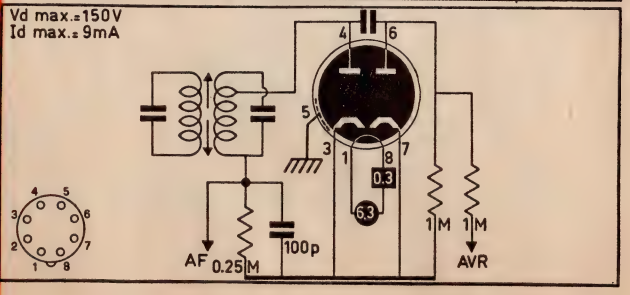

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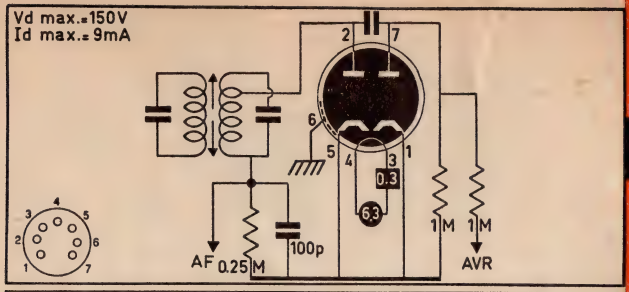

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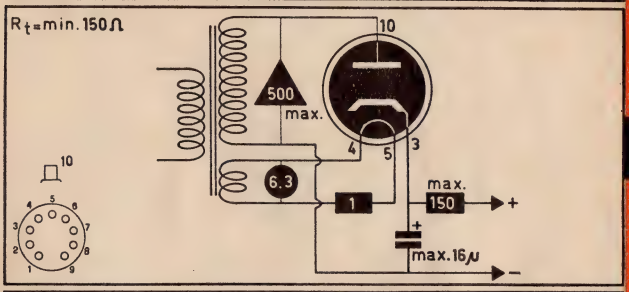

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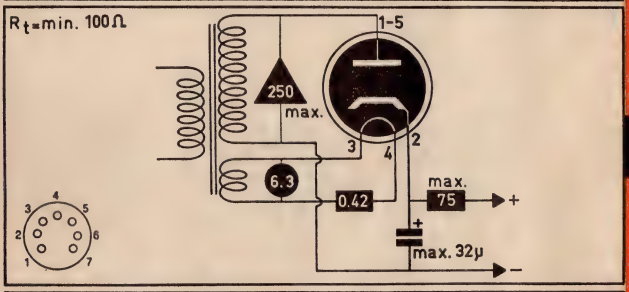

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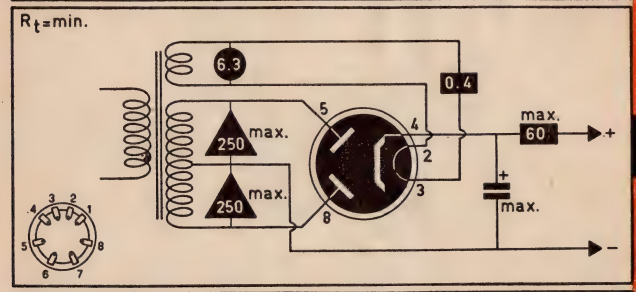

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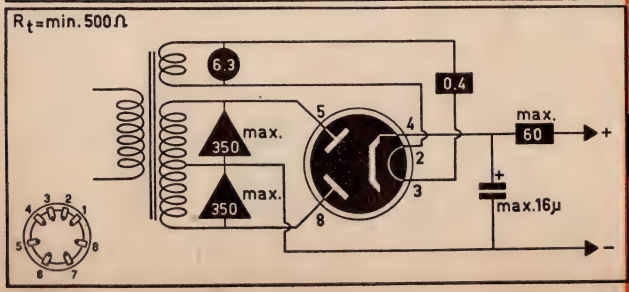

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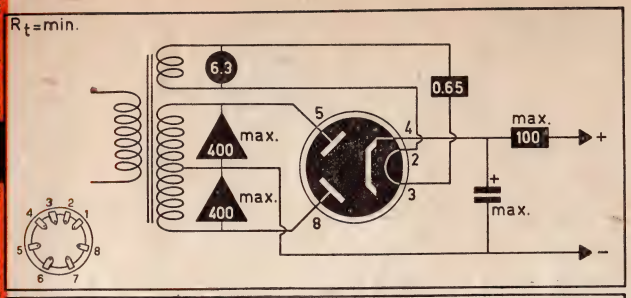

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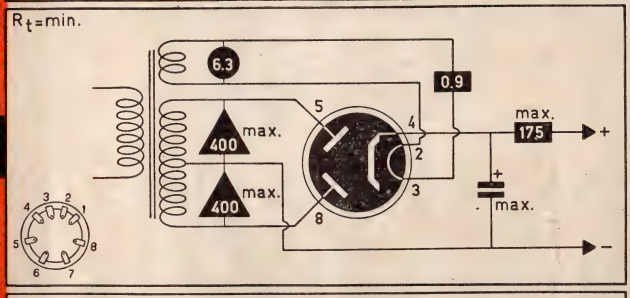

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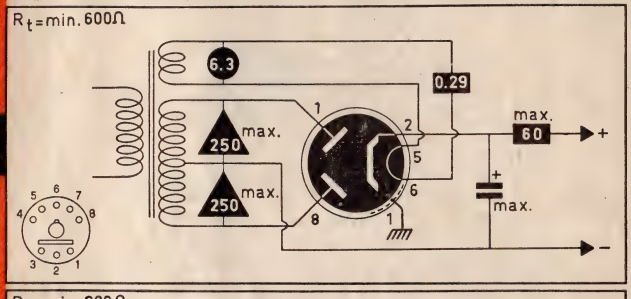

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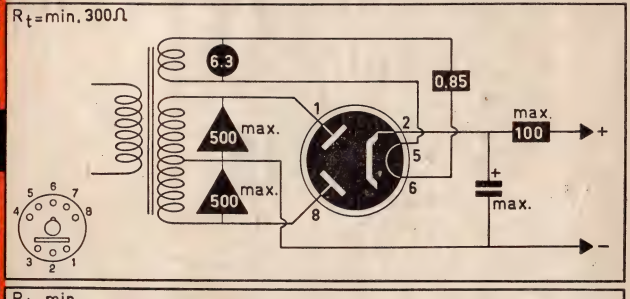

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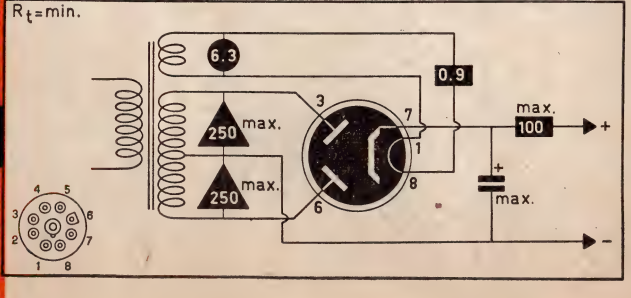

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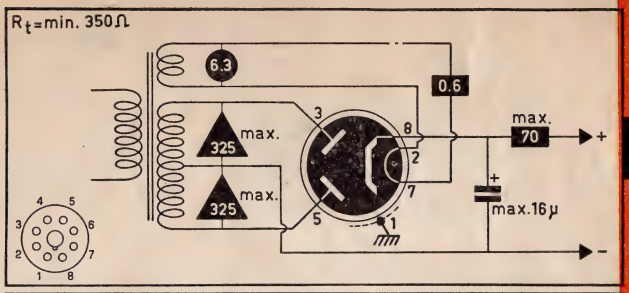

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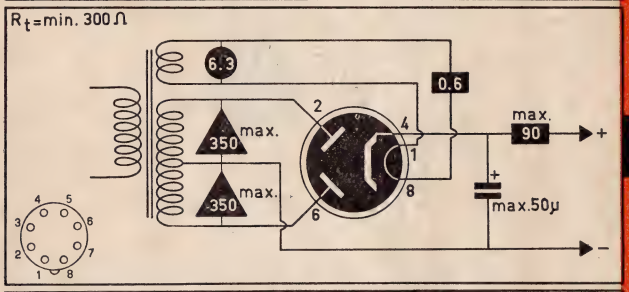

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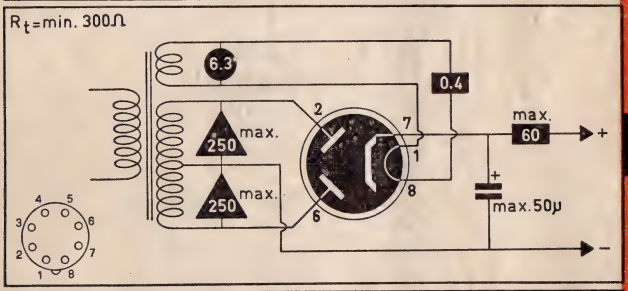

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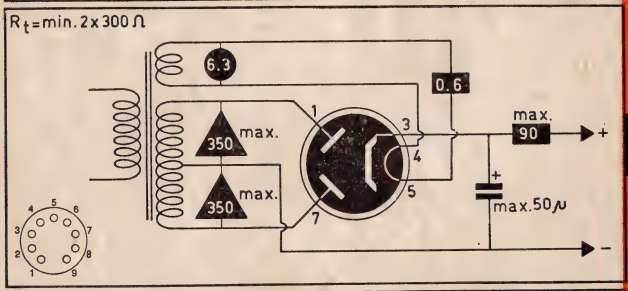

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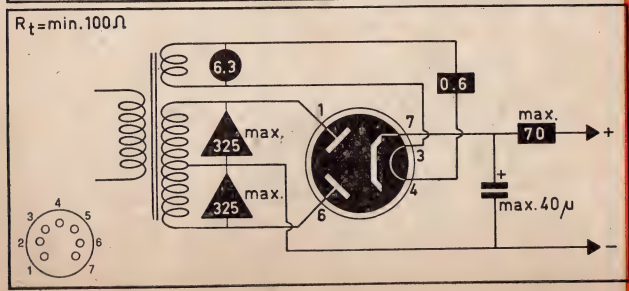

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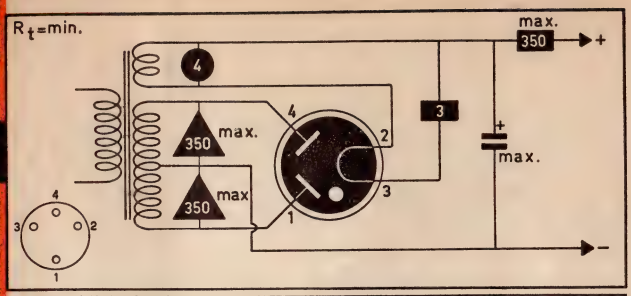

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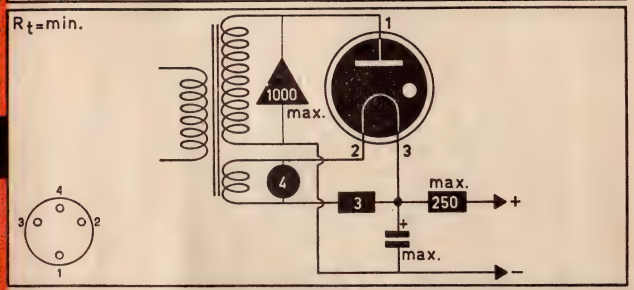

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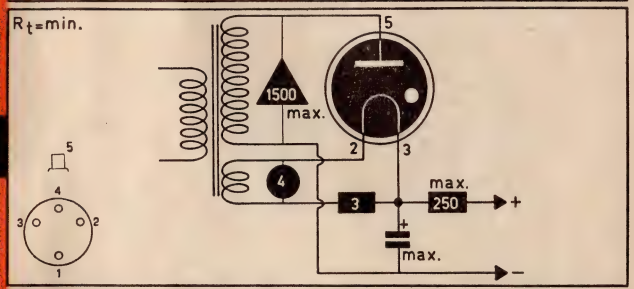

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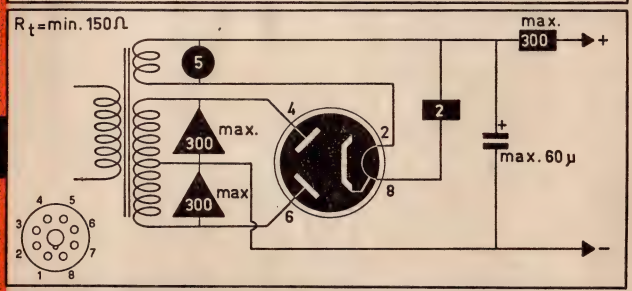

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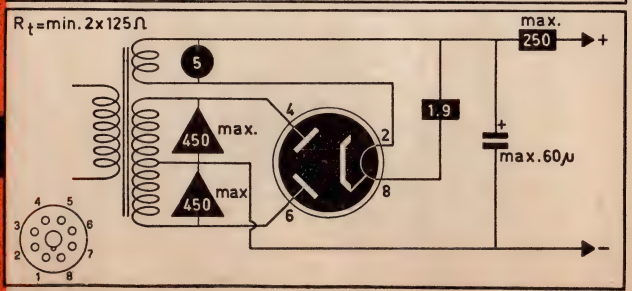

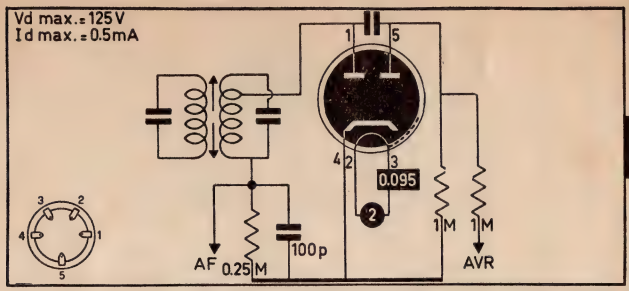

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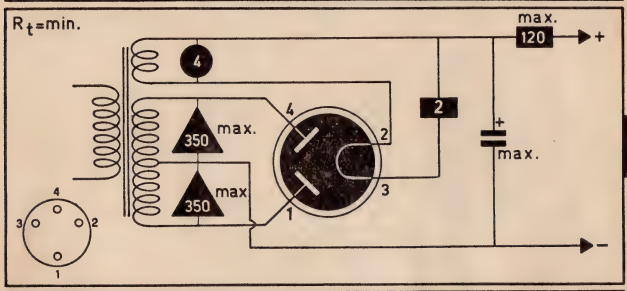

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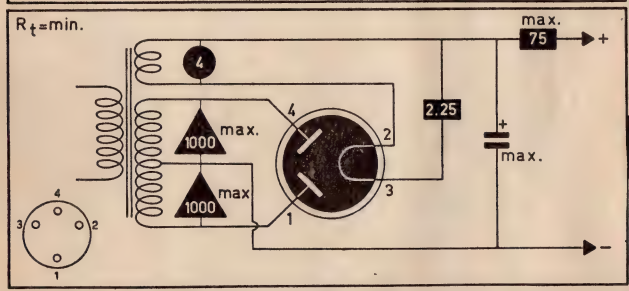

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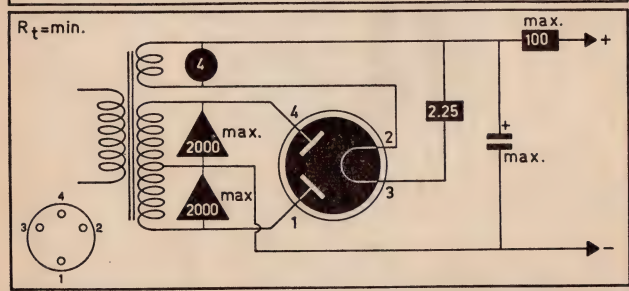

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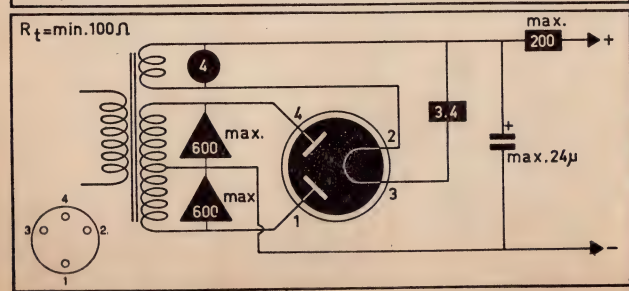

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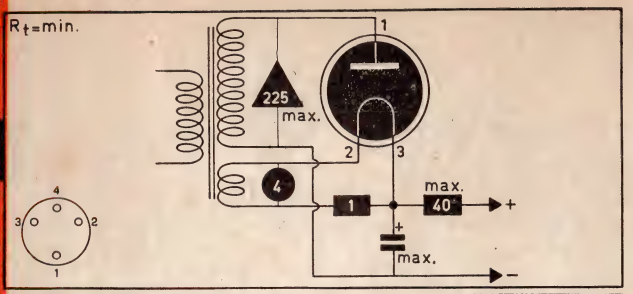

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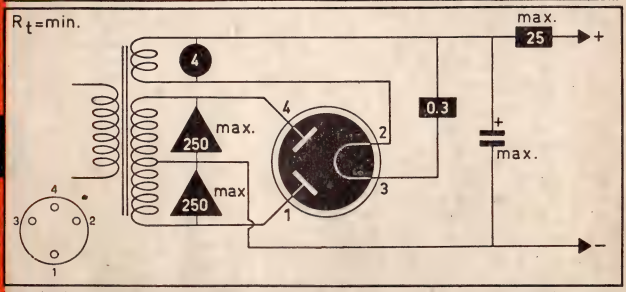

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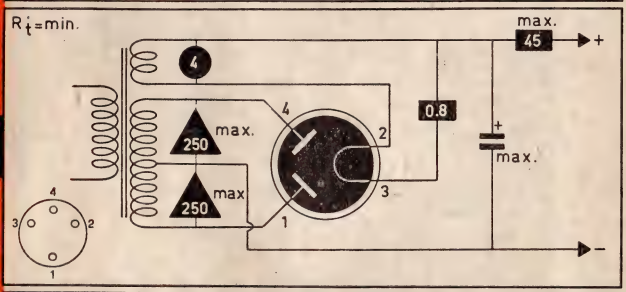

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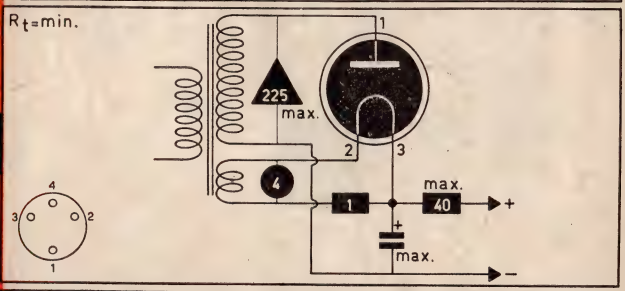

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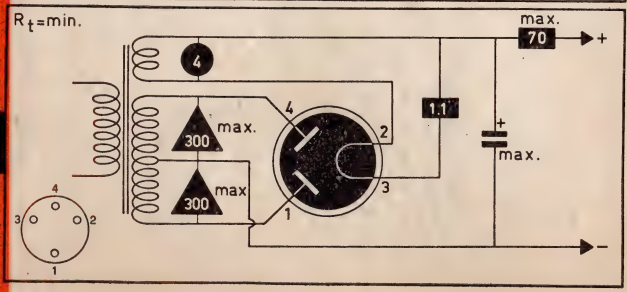

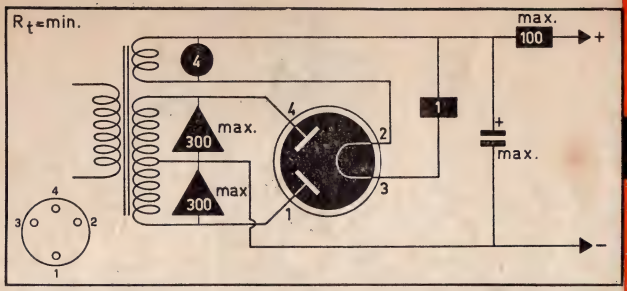

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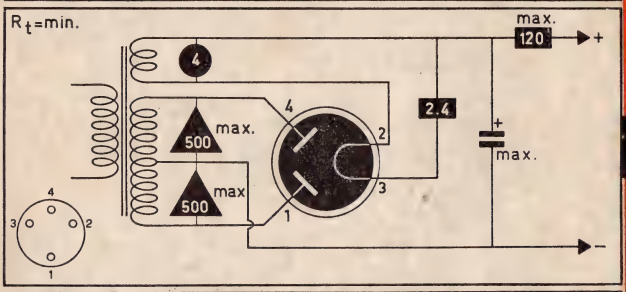

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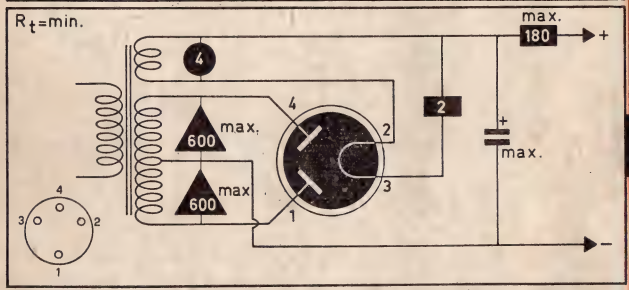

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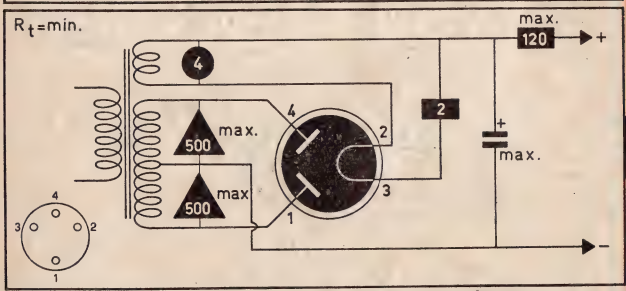

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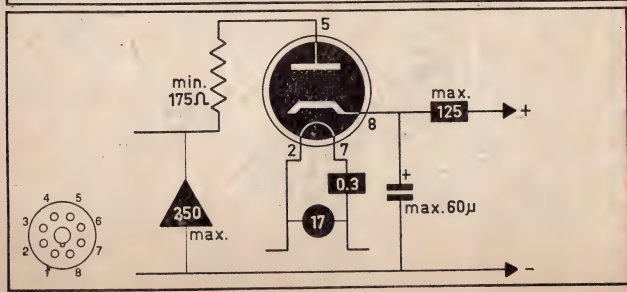

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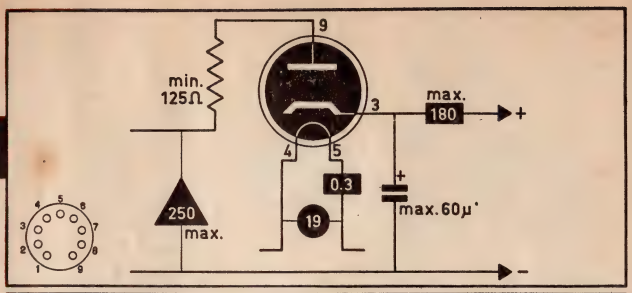

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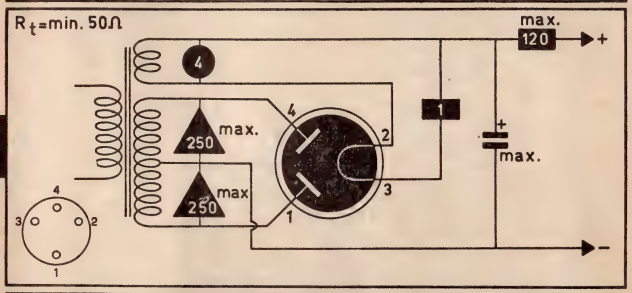

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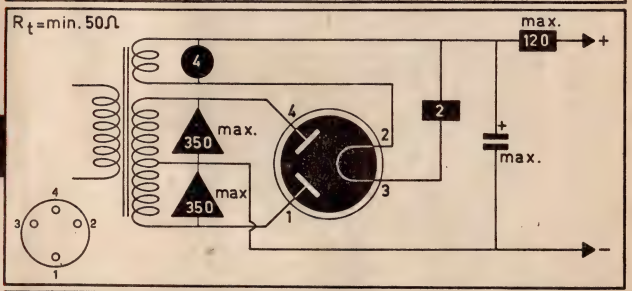

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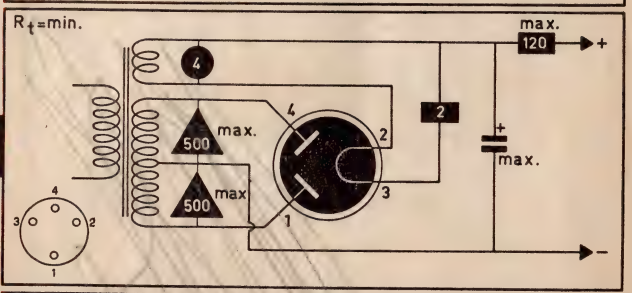

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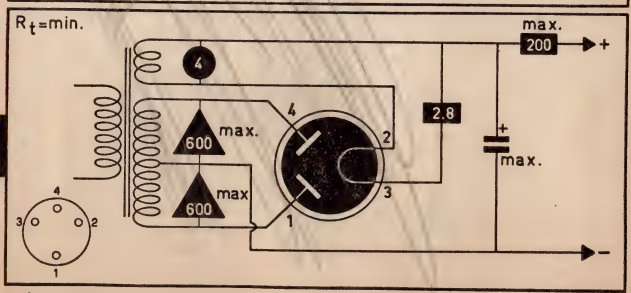

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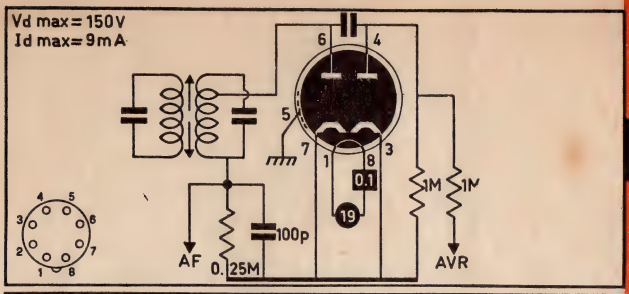

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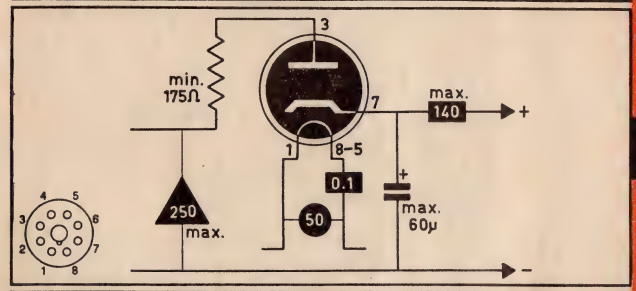

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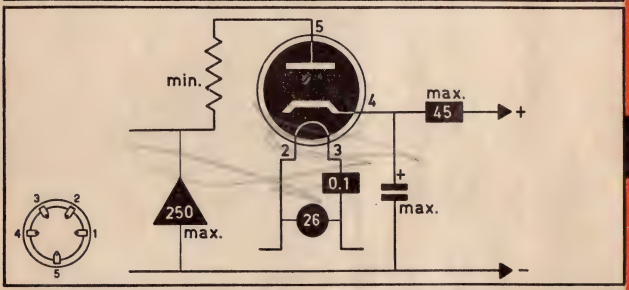

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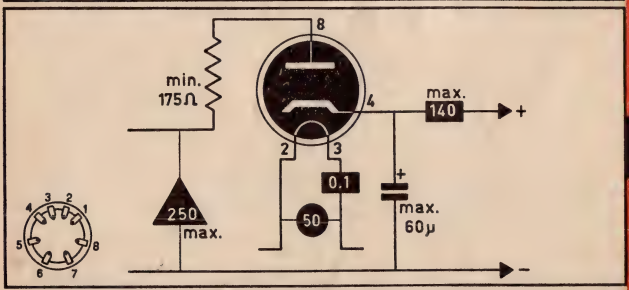

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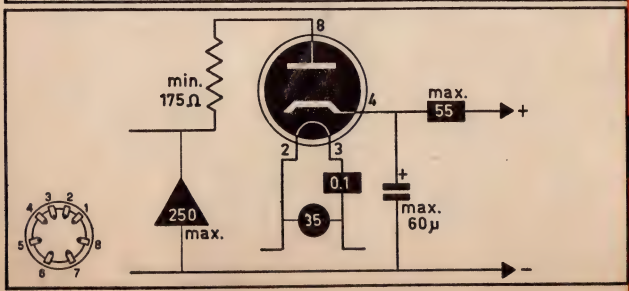

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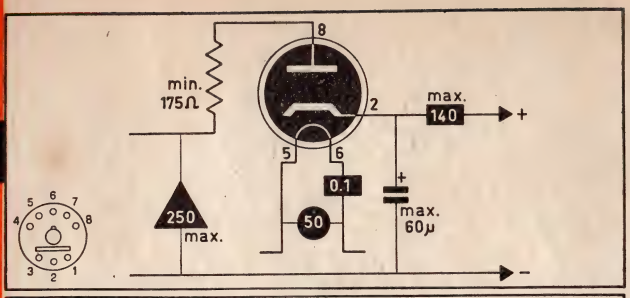

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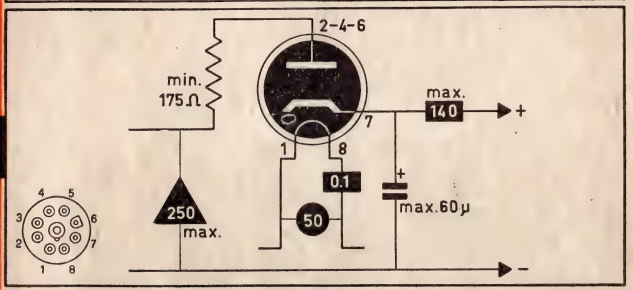

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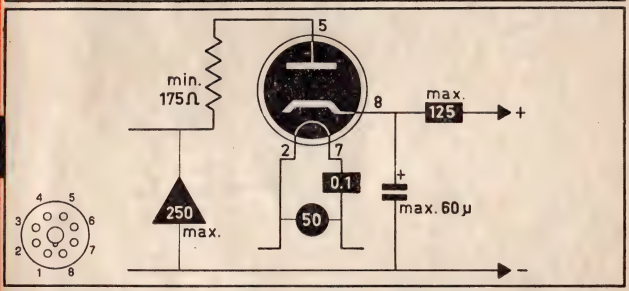

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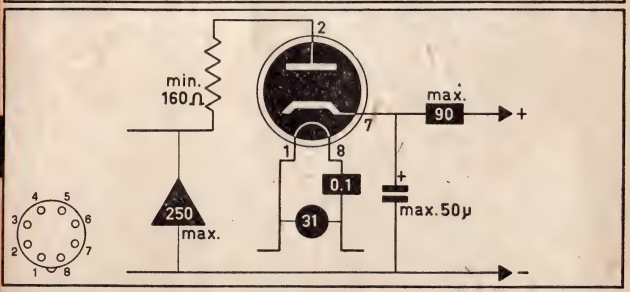

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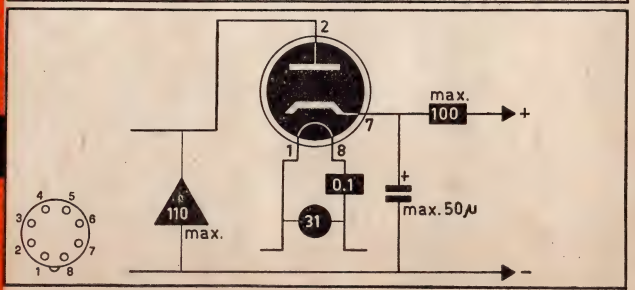

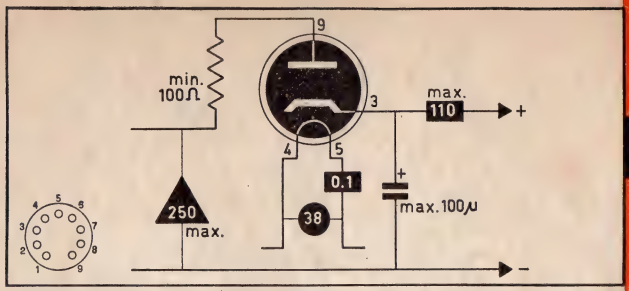

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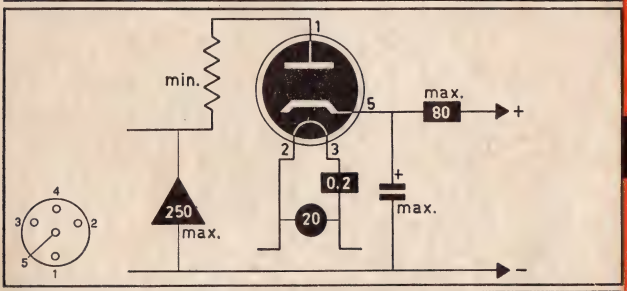

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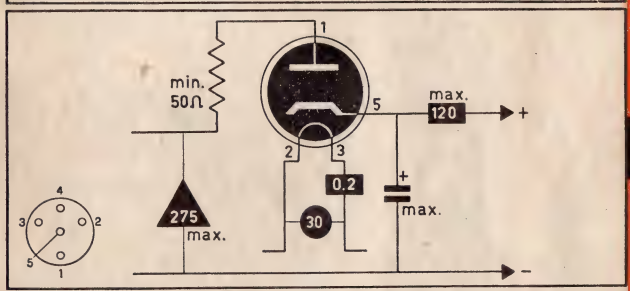

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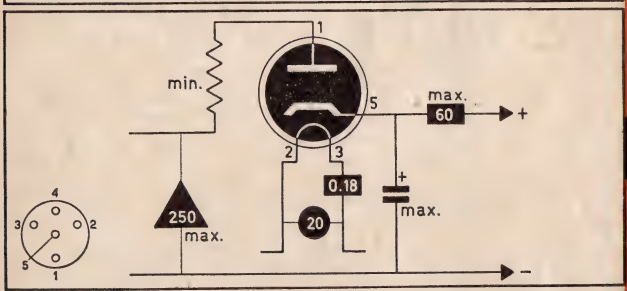

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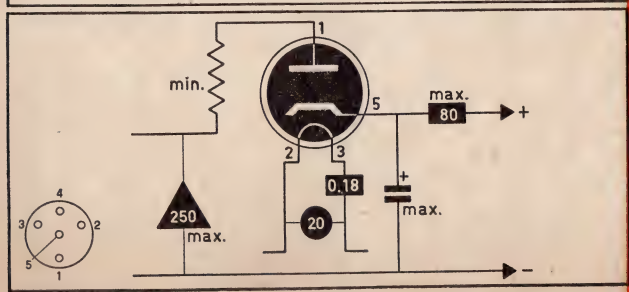

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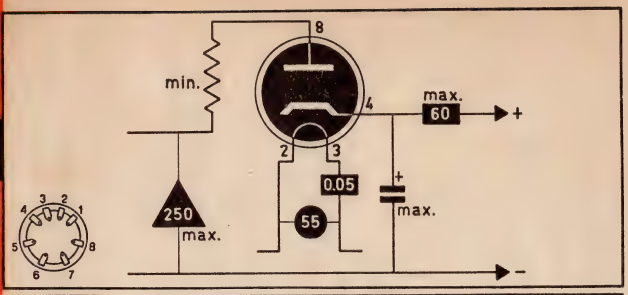
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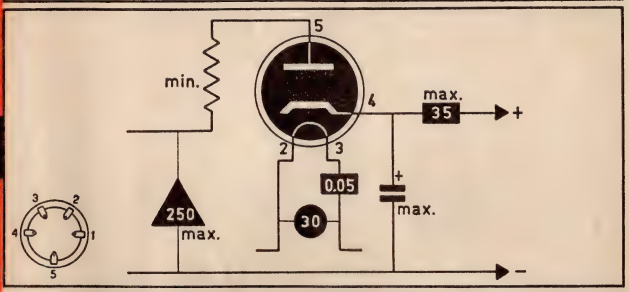
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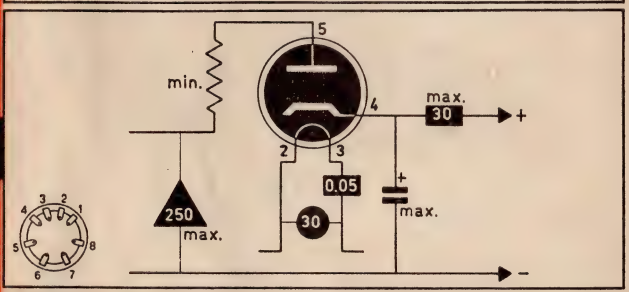
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5T4	5X4	-	-
5U4	5T4	-	-
5V4	-	-	83V
5X4	-	-	5U4
5Y3	-	-	5AZ4
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5Z3	-	-	5U4
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6H6	-	12H6	-
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83V	-	-	5V4
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AZ4	-	-	AZ12
AZ11	-	-	AZ1
AZ12	-	-	AZ4
AZ31	-	-	AZ11
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CY1	-	-	CY31
CY2	-	-	CY32
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CY32	-	-	CY2
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EB4	-	-	EB34
EB34	-	-	EB4
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EZ11	-	EZ1	EZ1
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UY1N	-	-	UY3
UY3	-	-	UY1N
UY11	-	-	UY3
UY21	-	-	UY11

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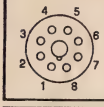
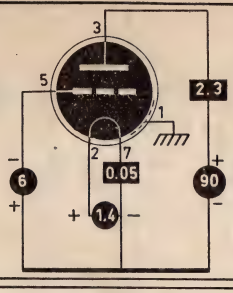
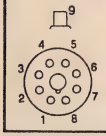
Wa =

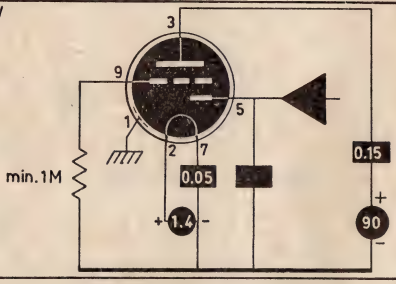




1H5

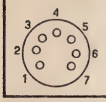
S = 0.275 mA/V
μ = 65
Ri = 240 k
Wa =





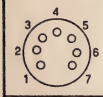
6AB4

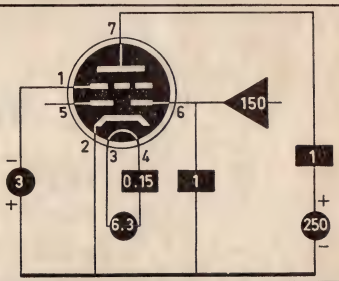
S = 5.5 m A/V
μ = 60
Ri = 10.9 k
Wa = max. 2.5 W



6AQ6

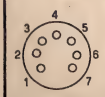
S = 1.2 mA/V
μ = 70
Ri = 58 k
Wa = max. 0.5 W

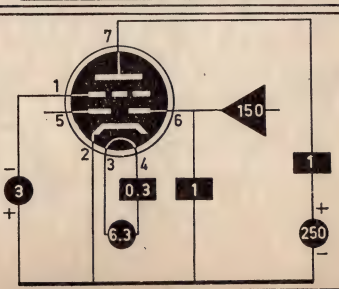




6AT6

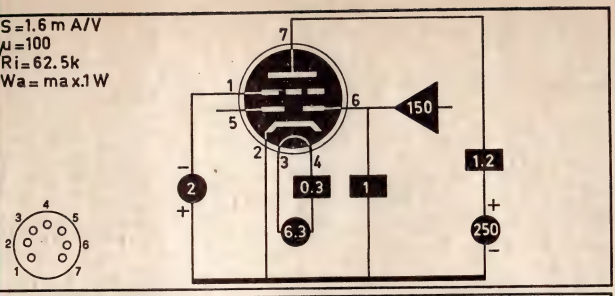
S = 1.2 m A/V
μ = 70
Ri = 58 k
Wa = max. 0.5 W





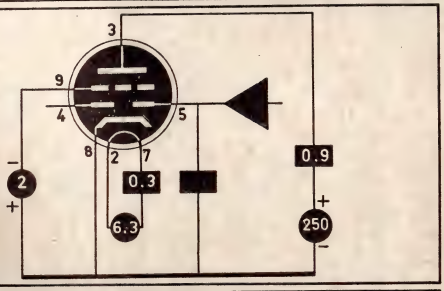
6AV6

S = 1.6 m A/V
μ = 100
Ri = 62.5k
Wa = max. 1 W



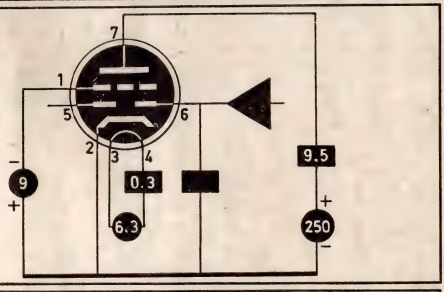
6B6

S = 1.1 m A/V
μ = 100
Ri = 91kΩ
Wa =



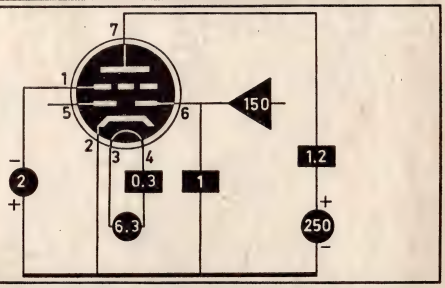
6BF6

S = 1.9 m A/V
μ = 16
Ri = 8.5k
Wa = max. 2.5 W



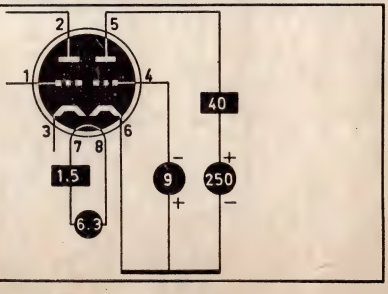
6BK6

S = 1.6 m A/V
μ = 100
Ri = 62.5k
Wa = max. 1 W



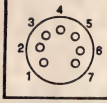
6BL7

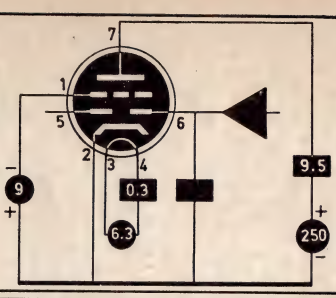
S = 7 mA/V
μ = 15
Ri = 2.15k
Wa = max. 10 W per sect
max. 12 W tot



6BU6

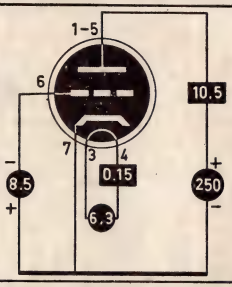
S=1.9mA/V
μ=16
Ri=8.5k
Wa=





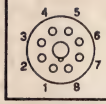
6C4

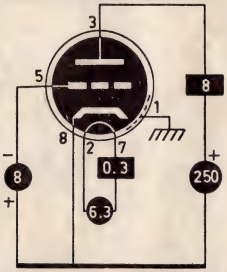
S=2.2mA/V
μ=17
Ri=7.7k
Wa=max.3.5W



6C5

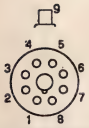
S=2mA/V
μ=20
Ri=10k
Wa=max.2.5W

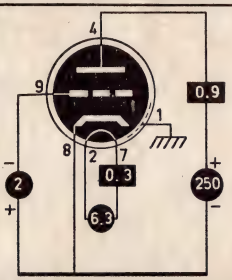




6F5

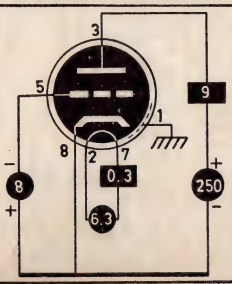
S=1.5mA/V
μ=100
Ri=66k
Wa=





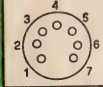
6J5

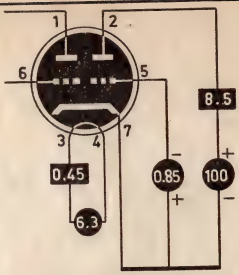
S=2.6mA/V
μ=20
Ri=7.7k
Wa=max.2.5W



6J6

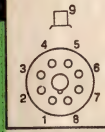
S= 5,3 m A/V
μ= 38
Ri=7.1k
Wa=max .1.5 W

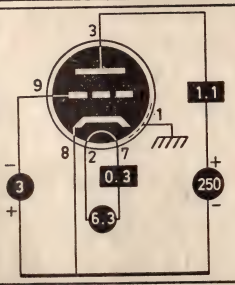




6K5

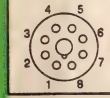
S=1.4 m A/V
μ=70
Ri=50k
Wa=

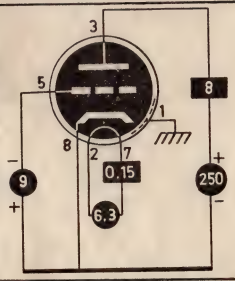




6L5

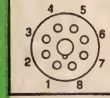
S= 2m A/V
μ=19
Ri=9k
Wa=

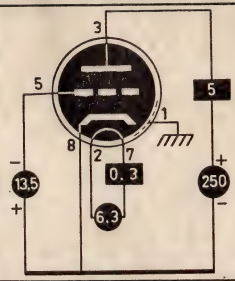




6P5

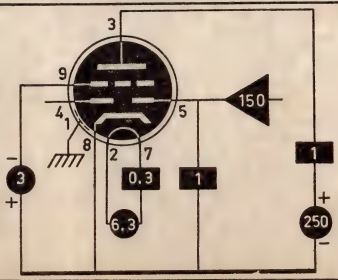
S=1.4 m A/V
μ=13.8
Ri=9.5k
Wa=





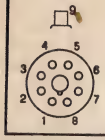
6Q7

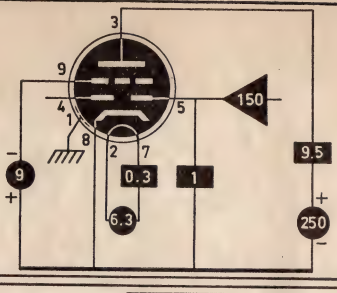
S=1.2m A/V
μ=70
Ri=58k
Wa=max.1W



6R7

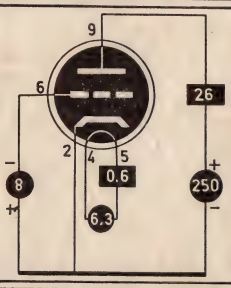
S = 1.9 mA/V
μ = 16
Ri = 8.5k
Wa =





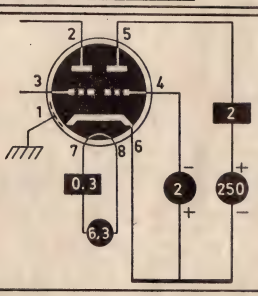
6S4

S = 4.5 mA/V
μ = 16
Ri = 3.6k
Wa = max. 7.5W



6SC7

S = 1.325 mA/V
μ = 70
Ri = 53k
Wa =

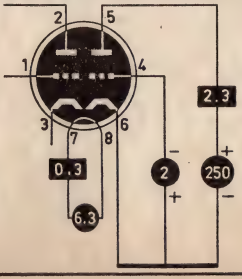


6SF5

S = 1.5 mA/V
μ = 100
Ri = 66k
Wa =

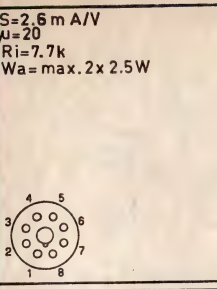
6SL7

S = 1.6 mA/V
μ = 70
Ri = 44k
Wa = max. 2x1W



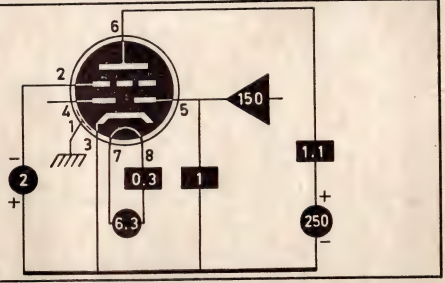
6SN7

S=2.6 m A/V
μ=20
Ri=7.7k
Wa=max. 2x 2.5W



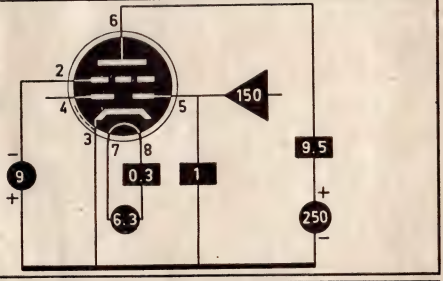
6SQ7

S=1.18 m A/V
μ=100
Ri=85k
Wa=max. 1W



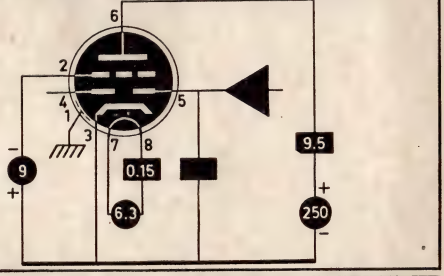
6SR7

S=1.9 m A/V
μ=16
Ri=8.5k
Wa=max. 2.5W



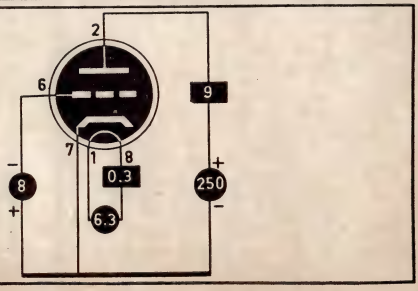
6ST7

S=1.88m A/V
μ=16
Ri=8.5k
Wa=max. 2.5W



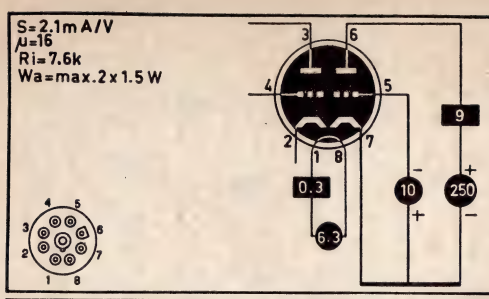
7A4

S=2.6 m A/V
μ=20
Ri=7.7k
Wa=max. 2.5W



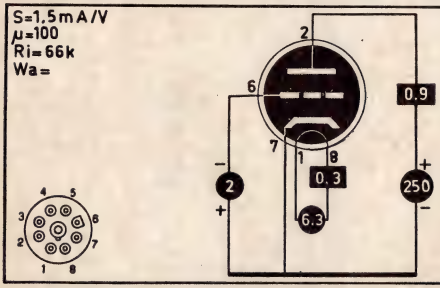
7AF7

S=2.1m A/V
μ=16
Ri=7.6k
Wa=max.2x1.5 W



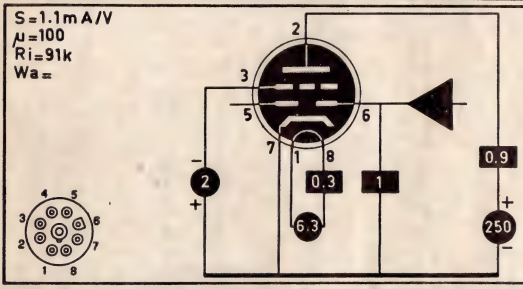
7B4

S=1.5m A/V
μ=100
Ri=66k
Wa=



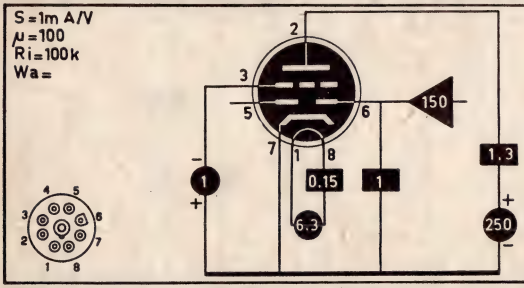
7B6

S=1.1m A/V
μ=100
Ri=91k
Wa=



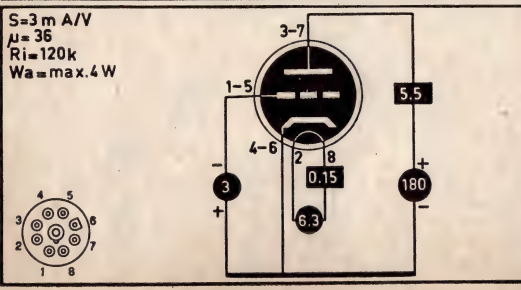
7C6

S=1m A/V
μ=100
Ri=100k
Wa=



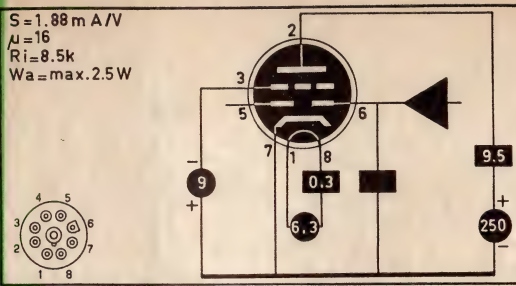
7E5

S=3 m A/V
μ=36
Ri=120k
Wa=max.4 W



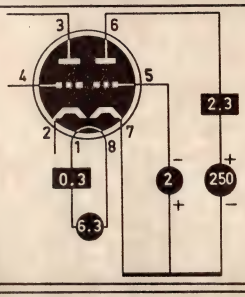
7E6

S = 1.88 m A/V
μ = 16
Ri = 8.5k
Wa = max. 2.5 W



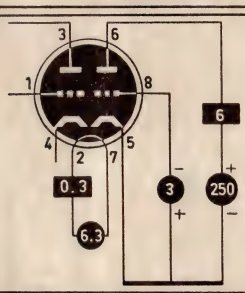
7F7

S = 1,6 m A/V
μ = 70
Ri = 44k
Wa = max. 2 x 1 W



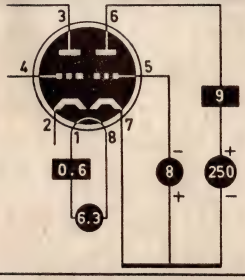
7F8

S = 3.3 m A/V
μ = 48
Ri = 14.5k
Wa = max. 3.5 W



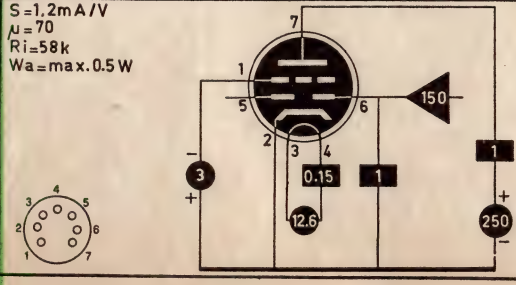
7N7

S = 2.6 m A/V
μ = 20
Ri = 7.7k
Wa = max. 2 x 2.5 W

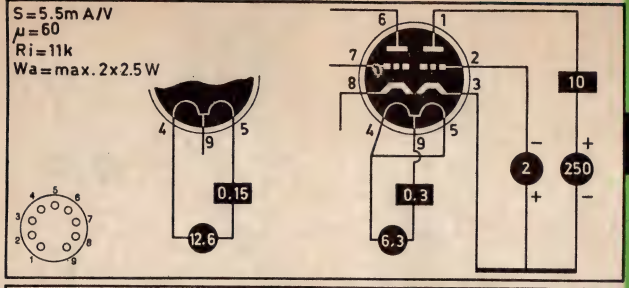


12AT6

S = 1,2 m A/V
μ = 70
Ri = 58k
Wa = max. 0.5 W

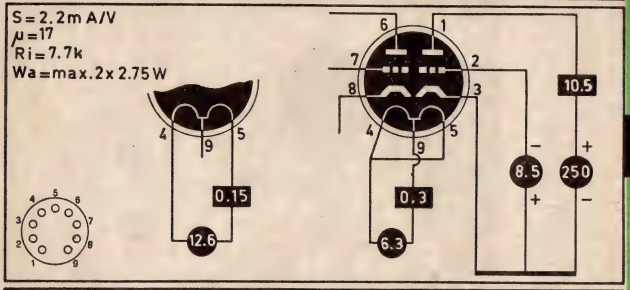


S = 5.5 m A/V
μ = 60
Ri = 11k
Wa = max. 2 x 2.5 W



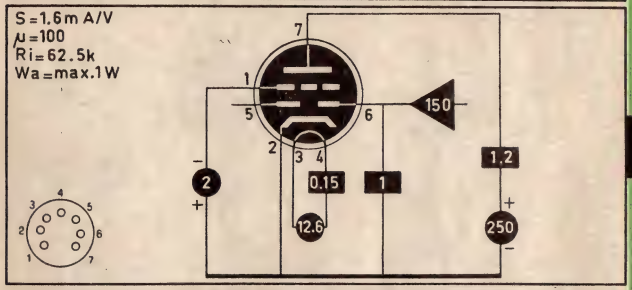
12AT7

S = 2.2 m A/V
μ = 17
Ri = 7.7k
Wa = max. 2 x 2.75 W



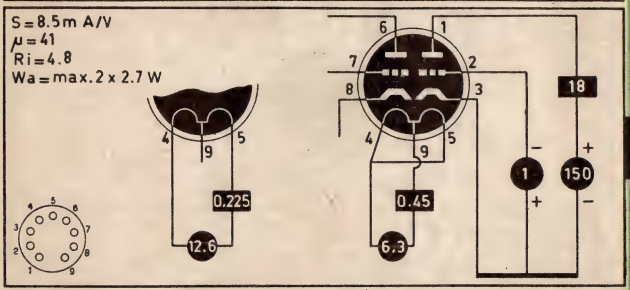
12AU7

S = 1.6 m A/V
μ = 100
Ri = 62.5k
Wa = max. 1 W



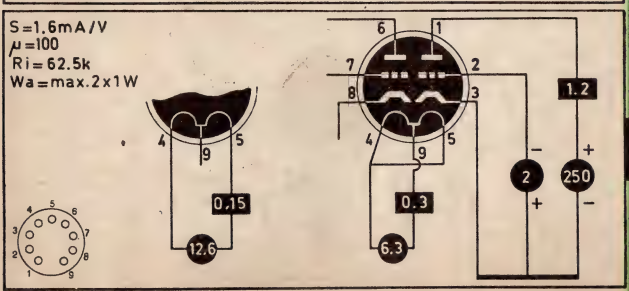
12AV6

S = 8.5 m A/V
μ = 41
Ri = 4.8
Wa = max. 2 x 2.7 W



12AV7

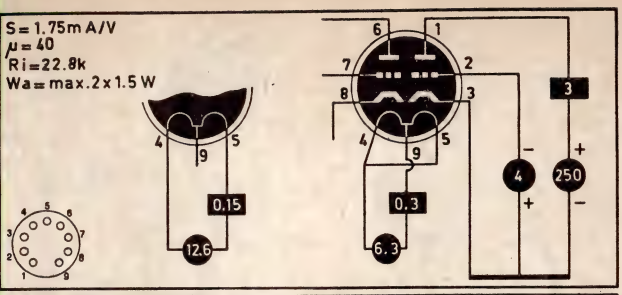
S = 1.6 m A/V
μ = 100
Ri = 62.5k
Wa = max. 2 x 1 W



12AX7

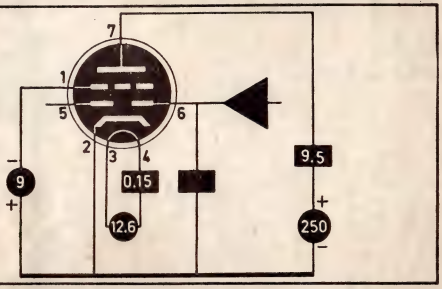
12AY7

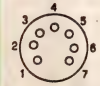
S = 1.75 m A/V
μ = 40
Ri = 22.8k
Wa = max. 2 x 1.5 W



12BF6

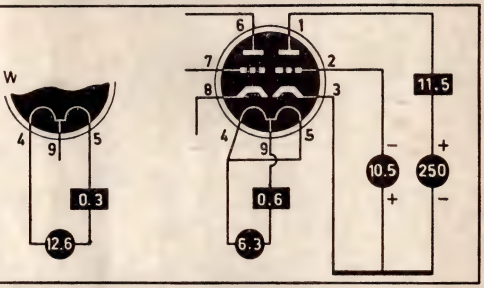
S = 1.9 m A/V
μ = 16
Ri = 8.5k
Wa = max. 2.5 W





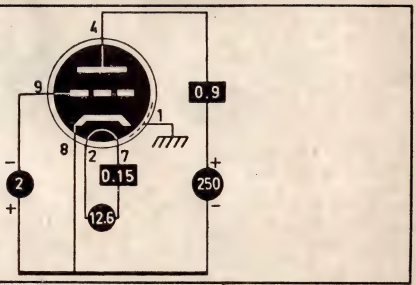
12BH7

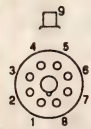
S = 3.1 m A/V
μ = 17
Ri = 5.5k
Wa = max. 2 x 3.5 W



12F5

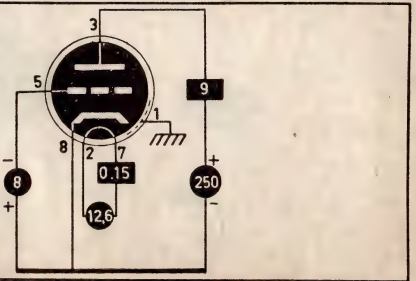
S = 1.5 m A/V
μ = 100
Ri = 66k
Wa =

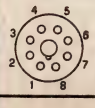




12J5

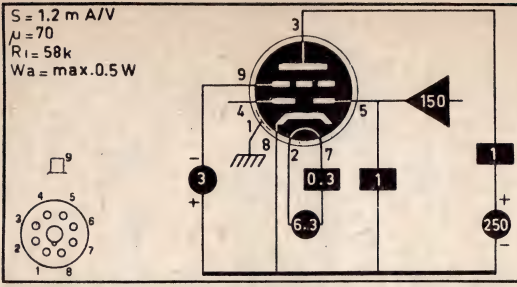
S = 2.6 m A/V
μ = 20
Ri = 7.7k
Wa = max. 2.5 W





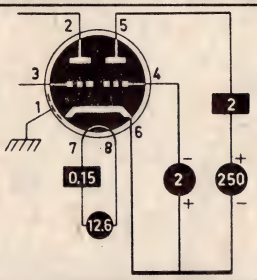
12Q7

S = 1.2 m A/V
μ = 70
Ri = 58k
Wa = max. 0.5 W



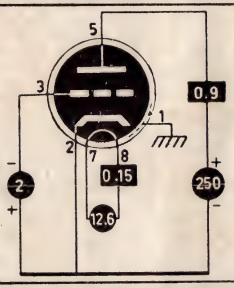
12SC7

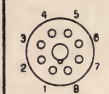
S = 1,325 m A/V
μ = 70
Ri = 53k
Wa =



12SF5

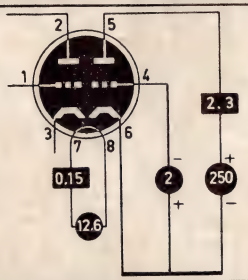
S = 1.5 m A/V
μ = 100
Ri = 66k
Wa =

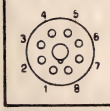




12SL7

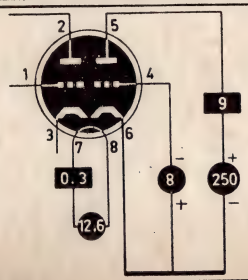
S = 1.6 m A/V
μ = 70
Ri = 44k
Wa =

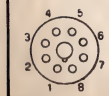




12SN7

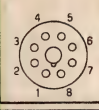
S = 2.6 m A/V
μ = 20
Ri = 7.7k
Wa = max 2x2.5 W

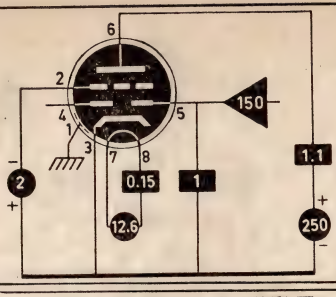




12SQ7

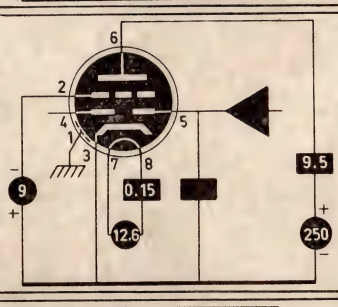
S = 1.18 m A/V
μ = 100
Ri = 85k
Wa =





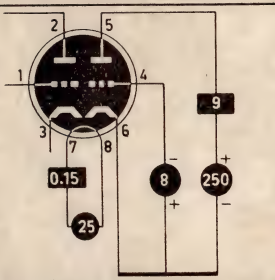
12SR7

S = 1.9 m A/V
μ = 16
Ri = 8.5k
Wa = max 2.5 W



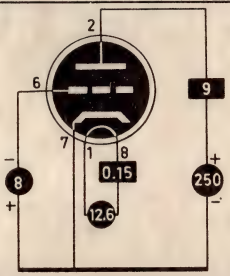
13D1

S = 2.6 m A/V
μ = 20
Ri = 7.7k
Wa = max. 2x2.5 W



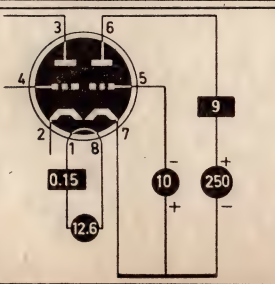
14A4

S = 2.6 m A/V
μ = 20
Ri = 7.7k
Wa = max. 2.5 W



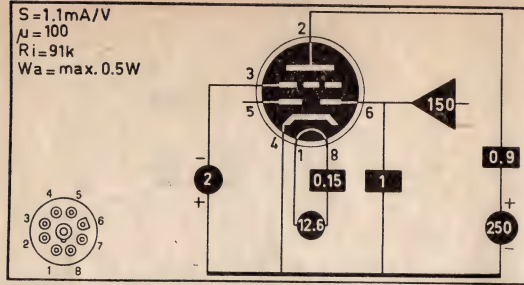
14AF7

S = 2.1 m A/V
μ = 16
Ri = 7.6k
Wa = max. 2x2.5 W



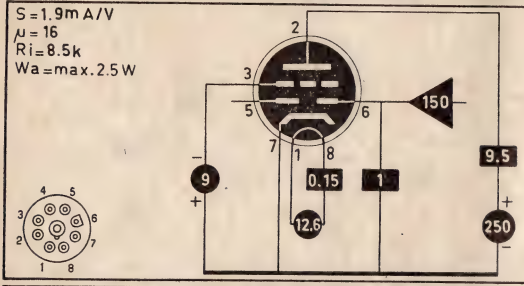
14B6

S = 1.1 mA/V
μ = 100
Ri = 91k
Wa = max. 0.5 W



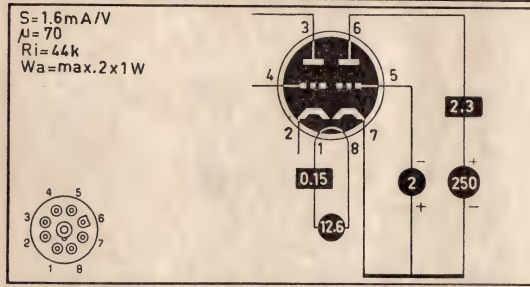
14E6

S = 1.9 mA/V
μ = 16
Ri = 8.5k
Wa = max. 2.5 W



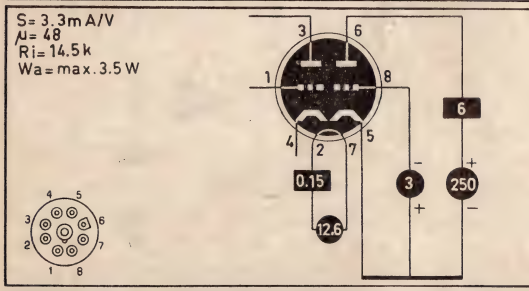
14F7

S = 1.6 mA/V
μ = 70
Ri = 44k
Wa = max. 2x1 W



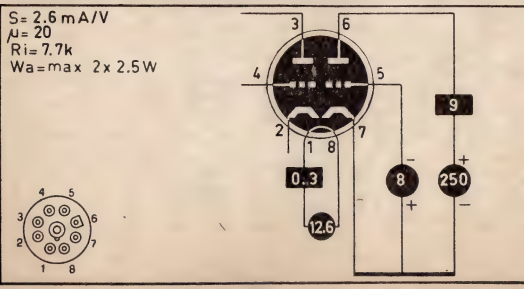
14F8

S = 3.3 mA/V
μ = 48
Ri = 14.5k
Wa = max. 3.5 W



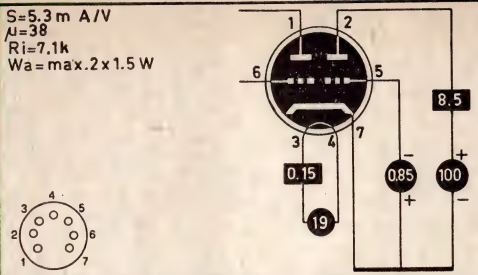
14N7

S = 2.6 mA/V
μ = 20
Ri = 7.7k
Wa = max 2x 2.5 W



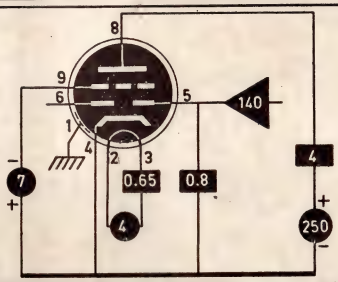
19J6

S=5.3 m A/V
μ=38
Ri=7.1k
Wa=max.2x1.5 W



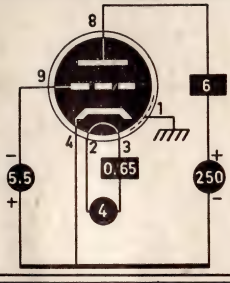
ABC1

S=2mA/V
μ=27
Ri=13.5k
Wa=max 1.5 W



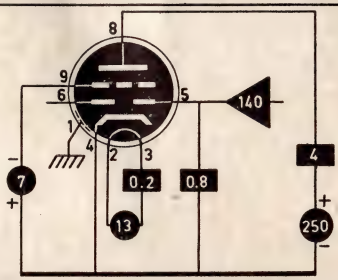
AC2

S=2.5m A/V
μ=30
Ri=12k
Wa=max.2 W



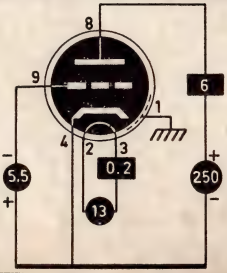
CBC1

S=2mA/V
μ=27
Ri=13.5k
Wa=max 1.5 W



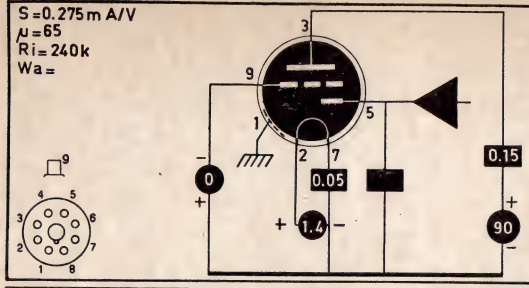
CC2

S=2.5mA/V
μ=30
Ri=12k
Wa=max.2 W



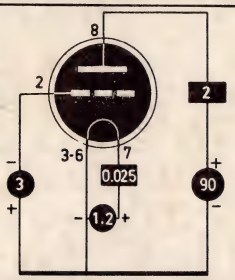
DAC32

S = 0.275 m A/V
μ = 65
Ri = 240 k
Wa =



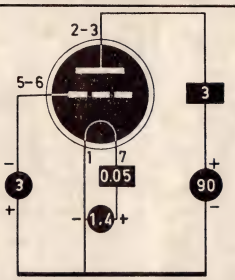
DC11

S = 0.9 m A/V
μ = 16
Ri = 17 k
Wa = max. 0.4 W



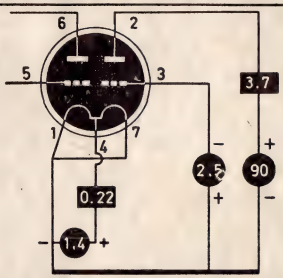
DC90

S = 1.1 m A/W
μ = 11.5
Ri = 10.4 k
Wa = max 0.6 W



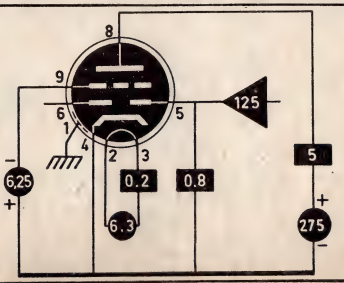
DCC90

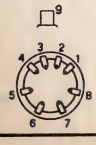
S = 1.8 m A/V
μ = 15
Ri = 8.3 k
Wa = max. 2 x 1 W



EBC3

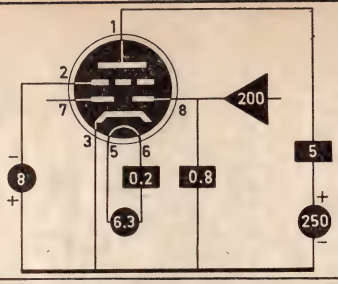
S = 2 m A/V
μ = 30
Ri = 15 k
Wa = max 1.5 W





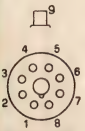
EBC11

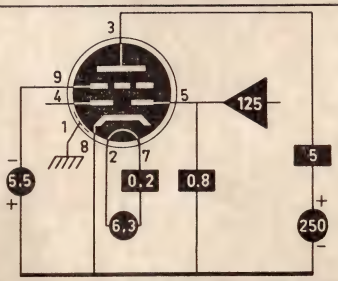
S = 2.2 m A/V
μ = 25
Ri = 11.5 k
Wa = max 1.5 W



EBC33

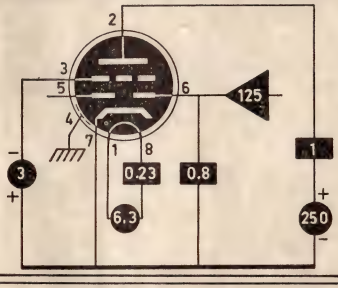
S = 3.2 m A/V
μ = 30
Ri = 15 k
Wa = max. 1.5 W





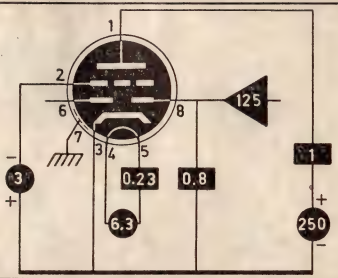
EBC41

S = 1.2 mA/V
μ = 70
Ri = 58 k
Wa = max. 0.5 W



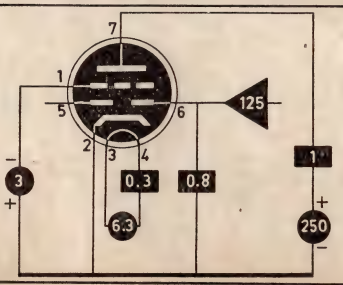
EBC81

S = 1.2 m A/V
μ = 70
Ri = 58 k
Wa = max. 0.5 W



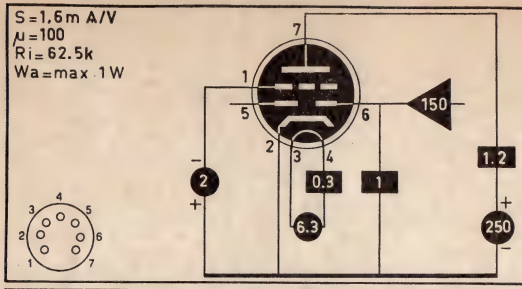
EBC90

S = 1.2 m A/V
μ = 70
Ri = 58 k
Wa = max. 0.5 W



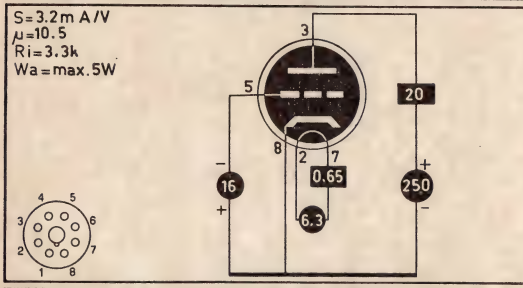
EBC91

S = 1.6 m A/V
μ = 100
Ri = 62.5 k
Wa = max. 1 W



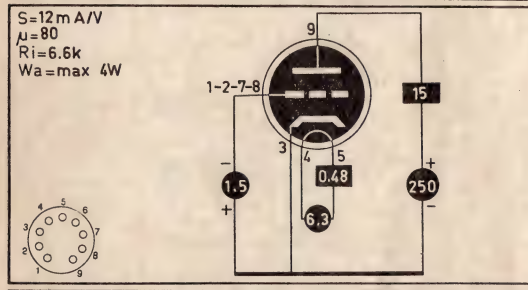
EC31

S = 3.2 m A/V
μ = 10.5
Ri = 3.3 k
Wa = max. 5 W



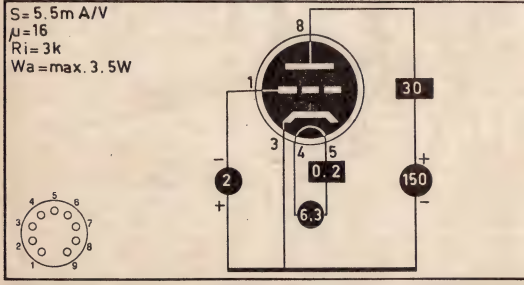
EC80

S = 12 m A/V
μ = 80
Ri = 6.6 k
Wa = max. 4 W



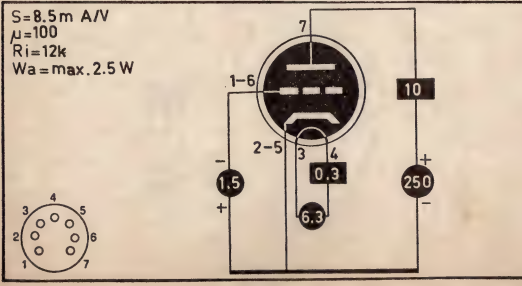
EC81

S = 5.5 m A/V
μ = 16
Ri = 3 k
Wa = max. 3.5 W



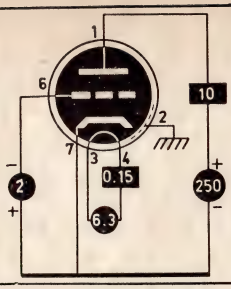
EC91

S = 8.5 m A/V
μ = 100
Ri = 12 k
Wa = max. 2.5 W



EC92

S=5mA/V
μ=60
Ri=12k
Wa=max. 2.5W

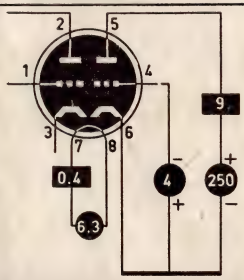


EC93

S=8mA/V
μ=15
Ri=
Wa=max. 2.25W

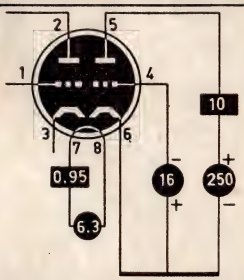
ECC33

S=3.6 mA/V
μ=35
Ri=9.7k
Wa=



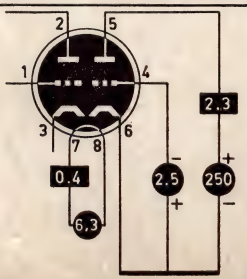
ECC34

S=2.2 mA/V
μ=11.5
Ri=5.2k
Wa=



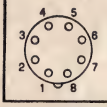
ECC35

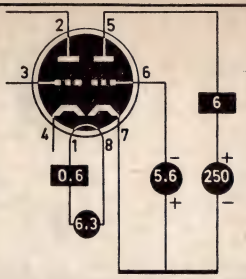
S=2mA/V
μ=68
Ri=34k
Wa=



ECC40

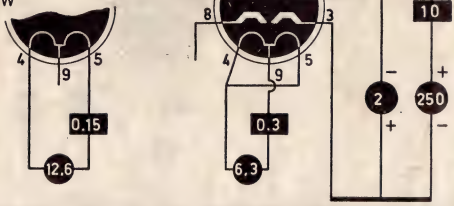
S=2.9mA/V
μ=32
Ri=11k
Wa=max.2x1.5W





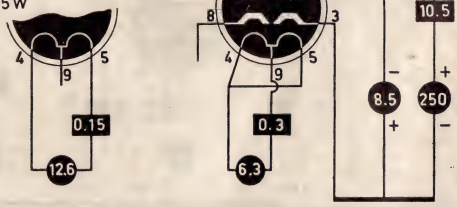
ECC81

S=5.5mA/V
μ=60
Ri=11k
Wa=max. 2x2.5W



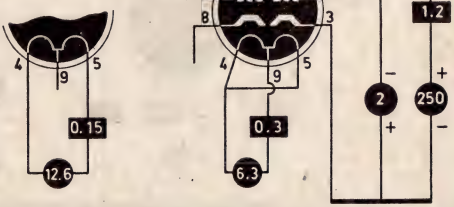
ECC82

S=2.2m A/V
μ=17
Ri=7.7k
Wa=max.2x2.75W



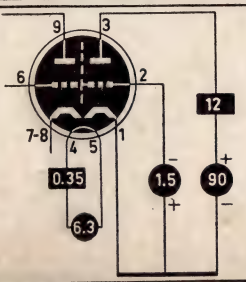
ECC83

S=1.6mA/V
μ=100
Ri=62.5k
Wa=max.2x1W



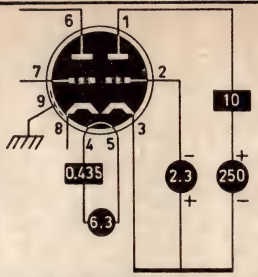
ECC84

S=6mA/V
μ=24
Ri=4k
Wa=max.2x2W



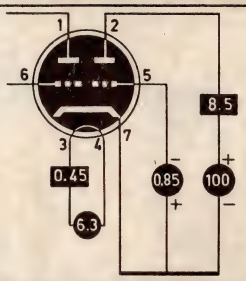
ECC85

S = 5.9 m A/V
μ = 57
Ri = 9.7 k
Wa = max. 2 x 2.5 W



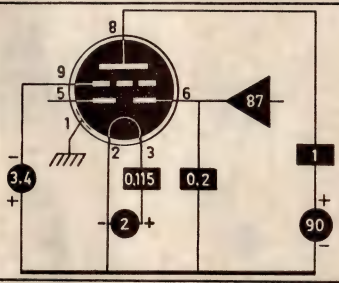
ECC91

S = 5.3 m A/V
μ = 38
Ri = 7.1 k
Wa = max. 2 x 1.5 W



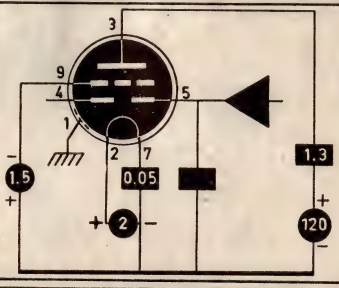
KBC1

S = 0.7 m A/V
μ = 16
Ri = 23 k
Wa = max. 0.6 W



KBC32

S = 1.2 m A/V
μ = 25
Ri = 21 k
Wa = max. 0.6 W

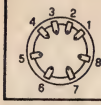


KC1

S = 0.4 m A/V
μ = 24
Ri = 60 k
Wa = max. 0.5 W

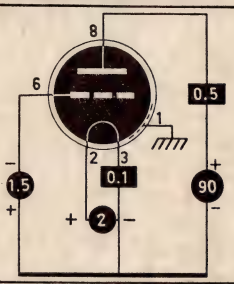
KC3

S=2.2 mA/V
μ=25
Ri=10k
Wa=max.1W



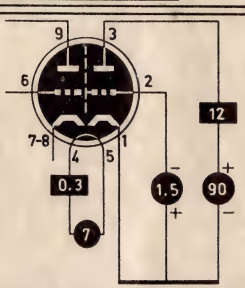
KC4

S=0.8m A/V
μ=30
Ri=37.5k
Wa=max. 0.5W



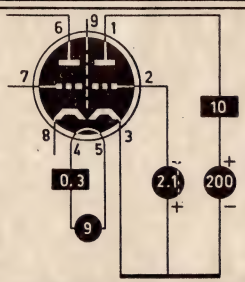
PCC84

S=6 mA/V
μ=24
Ri=4k
Wa=max 2x2W



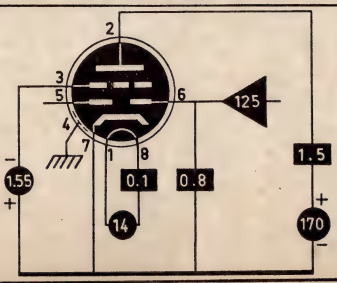
PCC85

S=5.8m A/V
μ= 48
Ri=8.3k
Wa=max. 2x2.5W



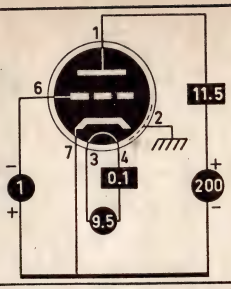
UBC41

S=1.65m A/V
μ=70
Ri=42k
Wa=max.0.5W



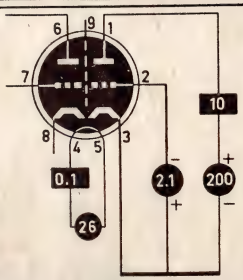
UC92

S= 6.4mA/V
μ= 66
Ri=
Wa=max.2.5W



UCC85

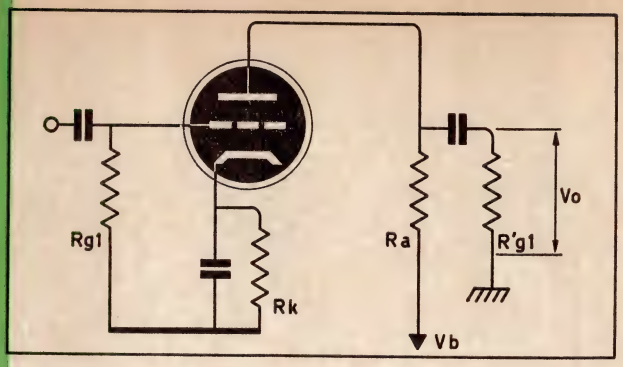
S= 5.8mA/V
μ= 48
Ri= 8.3k
Wa=max. 2x2.5W



6AB4	EC92	-	-
6AQ6	-	6AT6	-
6AT6	EBC90	6AQ6	-
6AV6	6BK6	12AV6	-
6B6	-	-	7B6
6BF6	-	12BF6	7E6
6BK6	EBC91	-	-
6BU6	6BF6	-	-
6F5	-	-	6SF5
6J5	-	12J5	7A4
6J6	ECC91	19J6	-
6Q7	-	12Q7	-
6R7	-	-	6SR7
6SC7	-	12SC7	-
6SF5	-	12SF5	6F5
6SL7	-	12SL7	-
6SN7	-	12SN7	7N7
6SQ7	-	12SQ7	-
6SR7	-	12SR7	-
6ST7	-	7E6	7E6
7A4	-	14A4	6J5
7AF7	-	14AF7	-
7B4	-	-	6F5
7B6	-	14B6	6B6
7E6	-	14E6	-
7F7	-	14F7	-
7F8	-	14F8	-
7N7	-	14N7	6SN7
12AT6	-	6AT6	-
12AT7	ECC81	-	-
12AU7	ECC82	-	-
12AV6	-	6AV6	-

	=		
12AX7	ECC83	-	-
12BF6	-	6BF6	-
12F5	-	6F5	-
12J5	-	6J5	14A4
12Q7	-	6Q7	-
12SC7	-	6SC7	-
12SF5	-	6SF5	12F5
12SL7	-	6SL7	-
12SN7	-	6SN7	14N7
12SQ7	-	6SQ7	-
12SR7	-	6SR7	-
13D1	-	6SN7	-
14A4	-	7A4	12J5
14AF7	-	7AF7	-
14B6	-	7B6	-
14E6	-	7E6	-
14F7	-	7F7	-
14F8	-	7F8	-
14N7	-	7N7	12SN7
19J6	-	6J6	-
ABC1	-	CBC1	-
AC2	-	CC2	-
CBC1	-	ABC1	-
CC2	-	AC2	-
EBC41	-	EBC90	EBC81
EBC81	-	-	EBC41
EBC90	6AT6	12AT6	-
EBC91	6AV6	12AV6	-
EC92	6AB4	-	-
ECC81	12AT7	-	-
ECC82	12AU7	-	-
ECC83	12AX7	-	-

	=		
ECC84	-	PCC84	-
ECC91	6J6	19J6	-
PCC84	-	ECC84	-
PCC85	-	UCC85	-
UCC85	-	PCC85	-



		Vb: 90V					
Ra	k	470			1000		
R'g1	M	1	4,7	10	2,2	4,7	10
Rk	k	–	–	–	–	–	–
Ia	mA	0,05	0,05	0,05	0,03	0,03	0,03
Vo max	Veff	4,89	6,2	6,65	5,66	6,8	7,45
A	—	28,7	32,6	33,2	35,4	37,8	39,2
d	%	4,5	4,5	4,7	4,5	4,65	4,7
		Rg1: 270 k					

		Vb: 100V					
Ra	k	100		270		470	
R'g1	k	270	470	270	470	470	1000
Rk	k	4,7	5,6	8,2	10	12	15
Ia	mA	0,23	0,21	0,13	0,12	0,09	0,08
Vo max	Veff	5	5,2	4,6	6	6,1	8,5
A	—	35,7	37,2	41,8	42,9	46,9	50
d	%	5	5,1	4,1	4,9	4,4	5

		Vb: 250V					
Ra	k	100		270		470	
R'g1	k	270	470	270	470	470	1000
Rk	k	1,8	1,8	3,3	3,3	4,7	5,6
Ia	mA	0,84	0,84	0,45	0,45	0,3	0,28
Vo max	Veff	26,5	28,5	24,5	29	25	33,5
A	—	53	52	59,8	64,4	65,8	69,8
d	%	5	4,4	4,95	4,4	4,1	4,2
		Rg1: 270 k					

6BF6
6BU6
6R7
6SR7
6ST7
7E6
12BF6
12SR7
14E6

		Vb: 100V					
Ra	k	47		100		270	
R'g1	k	100	270	100	470	270	470
Rk	k	1,8	2,2	2,7	3,9	6,8	8,2
Ia	mA	1,07	1	0,62	0,56	0,26	0,24
Vo max	Veff	10,6	13,2	9,5	14,2	11	12,8
A	—	10,4	10,6	10,9	11,5	11,3	11,6
d	%	4,5	4,9	4,7	4,8	4,9	4,3

		Vb: 250V					
Ra	k	47		100		270	
R'g1	k	100	270	100	470	270	470
Rk	k	1,5	1,8	2,2	3,3	5,6	8,2
Ia	mA	2,85	2,69	1,63	1,46	0,66	0,6
Vo max	Veff	31,2	38	26	40,4	28,5	40,6
A	—	11,1	11,7	11,7	12,3	12,1	12,2
d	%	4,5	4,6	4,4	4,5	4,5	4,9

Rg1: 270 k

6C4
12AU7

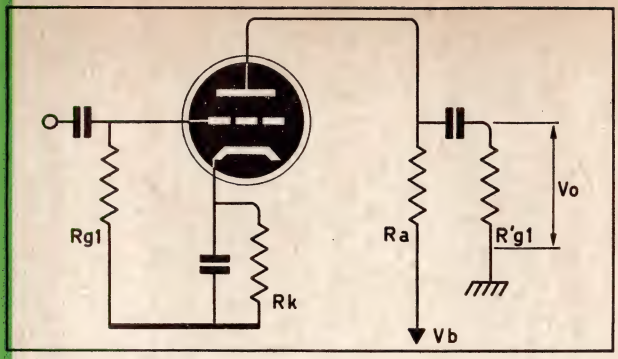
		Vb: 100V					
Ra	k	47		100		270	
R'g1	k	100	270	100	470	270	470
Rk	k	1,2	1,2	2,2	2,7	6,8	8,2
Ia	mA	1,22	1,22	0,66	0,63	0,26	0,25
Vo max	Veff	8,1	8,6	7,2	10,4	8,9	12,4
A	—	12,5	13,2	12,6	13,5	12,5	12,6
d	%	4,8	4,4	4,8	4,6	4,6	5

		Vb: 250V					
Ra	k	47		100		270	
R'g1	k	100	270	100	470	270	470
Rk	k	1	1	1,5	1,8	4,7	6,8
Ia	mA	3,2	3,2	1,78	1,72	0,68	0,63
Vo max	Veff	23	24	18,5	24,5	24,1	33,1
A	—	13,5	14,1	13,8	14,3	13,4	13,1
d	%	4,9	4,6	5	5	4,9	5

Rg1: 270 k

EBC3

		Vb: 100V		Vb: 200V		Vb: 250V	
Ra	k	47	180	47	180	47	180
R'g1	k	680	680	680	680	680	680
Rk	k	5,6	12	5,6	12	1,8	3,9
Ia	mA	0,4	0,2	0,8	0,35	1,8	0,75
Vo	Veff	10	10	10	10	10	10
A	—	17	19	19	22	22	26
d	%	7	4,6	3,2	1,8	1	1



6C5

		Vb : 100V					
Ra	k	47		100		270	
R'g1	k	100	270	100	470	270	470
Rk	k	1,8	2,2	2,7	3,9	6,8	8,2
Ia	mA	0,98	0,9	0,58	0,51	0,24	0,23
Vo max	Veff	10,5	13,2	9,8	14,6	11,1	13,3
A	—	11,5	12	12,3	13,3	12,9	13,3
d	%	4	4	4,1	4,1	4,5	4,1

		Vb : 250V					
Ra	k	47		100		270	
R'g1	k	100	270	100	470	270	470
Rk	k	1,8	1,8	2,7	3,9	6,8	8,2
Ia	mA	2,5	2,5	1,45	1,28	0,6	0,57
Vo max	Veff	38,4	41,2	32,6	46,8	35	42
A	—	12,5	13,4	13,1	14,2	13,6	14
d	%	5	4	5	4,8	5	5
		Rg1 : 270k					

6L5

		Vb : 250V					
Ra	k	47		100		270	
R'g1	k	100	270	100	470	270	470
Rk	k	1,8	2,2	2,7	4,7	8,2	10
Ia	mA	2,7	2,49	1,54	1,27	0,6	0,56
Vo max	Veff	39,2	46,5	33,4	53,5	41,6	48,5
A	—	12,3	12,8	12,8	13,4	13,4	13,9
d	%	4,5	4,5	4,4	5	5,1	4,6
		Rg1 : 270k					

		Vb: 100V					
Ra	k	100		270		470	
R'g1	k	270	470	270	470	470	1000
Rk	k	3,3	3,3	5,6	5,6	8,2	10
Ia	mA	0,29	0,29	0,16	0,16	0,11	0,1
Vo max	Veff	8	8,9	7,75	8,93	8,7	12,2
A	—	34,8	37,1	40,8	44,6	45,8	48,8
d	%	3,6	3,4	3,95	3,4	3,9	4,6

		Vb: 250V					
Ra	k	100		270		470	
R'g1	k	270	470	270	470	470	1000
Rk	k	1,8	2,2	3,3	3,9	5,6	6,8
Ia	mA	0,95	0,88	0,48	0,46	0,31	0,29
Vo max	Veff	33,3	38,5	30,8	39,6	37,5	48,6
A	—	42,2	43,3	48,9	51,4	52,8	56,6
d	%	3,67	4,28	3,4	4,3	4,8	4,95
		Rg1: 270 k					

6AQ6
6AT6
6K5
6Q7
12AT6
12Q7

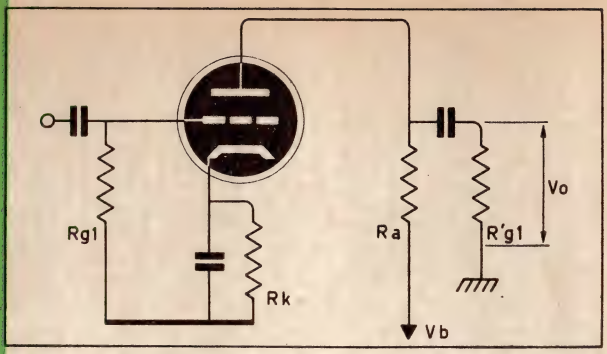
		Vb: 100V					
Ra	k	47		100		270	
R'g1	k	100	270	100	470	270	470
Rk	k	1,8	2,2	3,3	4,7	8,2	10
Ia	mA	1,05	0,97	0,57	0,5	0,24	0,22
Vo max	Veff	12,5	15,5	12,9	19,2	13,7	17,7
A	—	13,1	13,9	13,6	14,7	14,4	14,7
d	%	3,9	4,2	4,9	4,7	4,4	4,5

		Vb: 250V					
Ra	k	47		100		270	
R'g1	k	100	270	100	470	270	470
Rk	k	1,5	2,2	2,7	3,9	6,8	8,2
Ia	mA	2,79	2,4	1,49	1,31	0,61	0,58
Vo max	Veff	39,9	52,5	38,4	53	42	49,4
A	—	14,7	15	15	16,1	15,9	16,2
d	%	4,1	4,9	4,9	4,6	4,7	4,5
		Rg1: 270 k					

6J5
6SN7
7A4
7N7
12J5
12SN7
13D1
14A4
14N7

		Vb: 100V					
Ra	k	47		100		270	
R'g1	k	100	270	100	470	270	470
Rk	k	2,2	2,7	3,3	5,6	10	12
Ia	mA	1	0,92	0,59	0,48	0,23	0,21
Vo max	Veff	13,7	17	12	19,5	13,7	19,1
A	—	11,4	12,2	12	12,6	12,5	13,2
d	%	4,6	5	4,5	5,1	5	4,9
		Rg1: 270 k					

6L5



		Vb: 100V					
Ra	k	100		270		470	
R'g1	k	270	470	270	470	470	1000
Rk	k	3,9	3,9	5,6	5,6	8,2	10
Ia	mA	0,22	0,22	0,14	0,14	0,1	0,09
Vo max	Veff	5,1	5,15	4,8	5,35	5,4	9
A	—	42,5	43	48	53,5	54	60
d	%	5,1	5	4,3	3,7	4,1	5

		Vb: 250V					
Ra	k	100		270		470	
R'g1	k	270	470	270	470	470	1000
Rk	k	1,5	1,8	2,7	2,7	3,9	4,7
Ia	mA	0,84	0,76	0,44	0,44	0,3	0,27
Vo max	Veff	26,5	30,5	24,5	27,5	23,5	34
A	—	56,4	56,5	63	70,5	71,3	75,5
d	%	4,5	5,3	5,1	4,2	5,2	5,3
		Rg1: 270k					

7C6

		Vb: 250V					
Ra	k	100		270		470	
R'g1	k	270	470	270	470	470	1000
Rk	k	1,8	1,8	2,7	3,3	3,9	4,7
Ia	mA	0,6	0,6	0,38	0,34	0,26	0,24
Vo max	Veff	19,8	22	19,4	28	22,8	32,3
A	—	36	40	47,5	52,9	57	64,6
d	%	5	4,5	3,7	4,8	3,6	3,6
		Rg1: 270k					

7E5

		Vb: 100V					
Ra	k	47		100		270	
R'g1	k	100	270	100	470	270	470
Rk	k	1	1,2	1,8	2,2	4,7	4,7
Ia	mA	1,06	1	0,59	0,56	0,25	0,25
Vo max	Veff	6,25	8,65	4,25	9,3	8,55	8,95
A	—	21,5	22,2	21,2	23,2	21,9	23
d	%	4,3	4,9	3	4,4	4,8	4

		Vb: 250V					
Ra	k	47		100		270	
R'g1	k	100	270	100	470	270	470
Rk	k	0,56	0,68	0,82	1,2	2,7	2,7
Ia	mA	3,05	2,95	1,74	1,6	0,67	0,67
Vo max	Veff	21	25,5	16,6	25,8	19,3	20,2
A	—	25,6	25,5	26	26,9	24,8	25,9
d	%	5	5	4,7	4,9	5	4,8
		Rg1: 270 k					

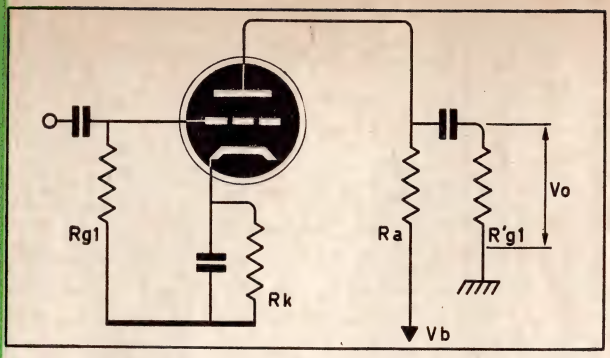
6SC7 6SL7 7F7 12SC7 12SL7 14F7

		Vb: 100V					
Ra	k	100		270		470	
R'g1	k	270	470	270	470	470	1000
Rk	k	3,3	3,3	5,6	5,6	6,8	8,2
Ia	mA	0,3	0,3	0,17	0,17	0,12	0,11
Vo max	Veff	10,3	10,4	7,7	8,6	8,5	13,5
A	—	31,2	31,5	36,6	41	42,5	45
d	%	4,9	4,8	4	3,1	3,4	4,4

		Vb: 250V					
Ra	k	100		270		470	
R'g1	k	270	470	270	470	470	1000
Rk	k	1,8	2,2	3,3	3,9	4,7	5,6
Ia	mA	0,92	0,83	0,48	0,44	0,31	0,29
Vo max	Veff	33,6	41,5	36,3	46,6	38,8	48,5
A	—	38,6	40,2	43,7	48	50,4	54
d	%	4	4,8	4,5	4,8	3,9	3,7
		Rg1: 270 k					

7C6

		Vb: 100V					
Ra	k	100		270		470	
R'g1	k	270	470	270	470	470	1000
Rk	k	4,7	4,7	6,8	6,8	10	10
Ia	mA	0,16	0,16	0,1	0,1	0,07	0,07
Vo max	Veff	3,95	4,3	4,16	4,9	6	7,15
A	—	26,4	28,6	34,7	40,7	43	51
d	%	5	4,7	4,3	3,7	5	4
		Rg1: 270 k					



7F8
14F8

		Vb: 100V					
Ra	k	47		100		270	
R'g1	k	100	270	100	470	270	470
Rk	k	1	1,2	1,8	2,2	4,7	4,7
Ia	mA	0,9	0,84	0,51	0,48	0,22	0,22
Vo max	Veff	4,74	6,8	4,45	8,8	6,7	7,1
A	—	26,3	26,2	26,2	29,4	28	29,6
d	%	3,7	4,8	3,6	4,7	4,3	3,7

		Vb: 250V					
Ra	k	47		100		270	
R'g1	k	100	270	100	470	270	470
Rk	k	0,39	0,47	0,82	1	2,2	2,2
Ia	mA	3	2,86	1,58	1,5	0,66	0,66
Vo max	Veff	13,5	21	17,8	25,5	20,4	21,6
A	—	33,8	38,2	35,6	36,4	34	36
d	%	4	4,6	4,6	4,9	4,5	4,2
		Rg1: 270 k					

EBC41
EBC81

		Vb: 250V			
Ra	k	100	220	100	220
R'g1	k	330	680	330	680
Rk	k	1,2	1,8	–	–
Ia	mA	1,15	0,7	1,4	0,76
Vo	Veff	10	10	10	10
A	—	43	51	44	52
d	%	1,1	0,9	0,9	0,8
		Rg1: 1M		Rg1: 10M	

ECC40

		Vb: 200V			Vb: 250V		
Ra	k	47	100	220	47	100	220
R'g1	k	150	330	680	150	330	680
Rk	k	1,2	2,2	3,9	1,2	2,2	3,9
Ia	mA	2	1,1	0,58	2,6	1,4	0,72
Vo max	Veff	30	33	32	40	44	44
A	—	20	24	24	20	24	25
d	%	3,4	3,6	3,5	3,8	3,7	3,6

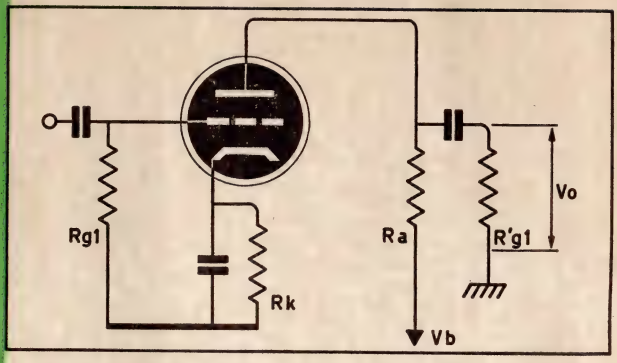
		Vb: 300V			Vb: 350V		
Ra	k	47	100	220	47	100	220
R'g1	k	150	330	680	150	330	680
Rk	k	1,2	2,2	3,9	1,2	2,2	3,9
Ia	mA	3,1	1,6	0,87	3,6	1,9	1
Vo max	Veff	50	54	53	60	65	63
A	—	20	24	25	20	24	25
d	%	4	3,8	3,7	4,1	3,9	3,7
		Rg1: 1M					

ECC82

		Vb: 100V			Vb: 200V		
Ra	k	47	100	220	47	100	220
R'g1	k	150	330	680	150	330	680
Rk	k	1,2	2,2	3,9	1,2	2,2	3,9
Ia	mA	1,2	0,66	0,33	2,41	1,3	0,66
Vo max	Veff	11	10	8	26	25	22
A	—	13,5	14	14,5	13,5	14	14,5
d	%	5,6	4,8	4	6,3	5,8	4,7

		Vb: 250V			Vb: 300V		
Ra	k	47	100	220	47	100	220
R'g1	k	150	330	680	150	330	680
Rk	k	1,2	2,2	3,9	1,2	2,2	3,9
Ia	mA	3,02	1,63	0,82	3,65	1,97	0,98
Vo max	Veff	34	32	28	43	41	36
A	—	13,5	14	14,5	13,5	14	14,5
d	%	6,4	5,9	4,8	6,5	6	4,9

		Vb: 350V			Vb: 400V		
Ra	k	47	100	220	47	100	220
R'g1	k	150	330	680	150	330	680
Rk	k	1,2	2,2	3,9	1,2	2,2	3,9
Ia	mA	4,3	2,3	1,16	5	2,62	1,31
Vo max	Veff	51	49	43	59	57	50
A	—	13,5	14	14,5	13,	14	14,5
d	%	6,6	6,1	5	6,7	6,2	5,1
		Rg1: 1M					



ECC83

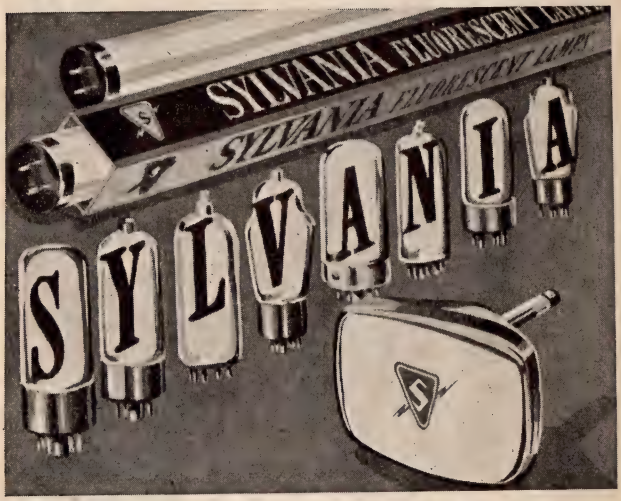
		Vb: 200V			Vb: 250V		
Ra	k	47	100	220	47	100	220
R'g1	k	150	330	680	150	330	680
Rk	k	1,5	1,8	3,3	1,2	1,5	2,7
Ia	mA	0,86	0,65	0,36	1,18	0,86	0,48
Vo max	Veff	18	20	24	23	26	28
A	—	34	50	56	37,5	54,5	66,5
d	%	8,5	4,8	4,6	7	3,9	3,4

		Vb: 300V			Vb: 400V		
Ra	k	47	100	220	47	100	220
R'g1	k	150	330	680	150	330	680
Rk	k	1	1,2	2,2	0,68	0,82	1,2
Ia	mA	1,55	1,11	0,63	2,45	1,72	1,02
Vo max	Veff	26	30	36	37	38	38
A	—	40	57	72	44	63	76,5
d	%	5	2,7	2,6	3,6	1,7	1,1
		Rg1: 1M					

UBC41

		Vb: 100V			Vb: 170V		
Ra	k	100	220	220	100	220	220
R'g1	k	330	680	680	330	680	680
Rk	k	3,9	5,6	-	3,9	5,6	-
Ia	mA	0,28	0,18	0,21	0,45	0,28	0,46
Vo	Veff	5	5	5	5	5	5
A	—	34	41	41	37	44	48
d	%	3,5	1,9	2	1,7	1,3	1,1
		Rg1: 1M		1OM	Rg1: 1M		1OM

Sylvania
"Originals"



Fluorescentiebuizen, Radio- en Televisie-beeldbuizen

Electronische producten

Diodes
Varistors
Klystrons
Flash Tubes
Thyratrons
Transistors
Trigger Tubes
Strobotrons
Magnetrons
Tubes Pirani

N.V. v/h Etn. A. P. CLOSSET

Alleenvertegenwoordiger voor Benelux
48, Handelskaai, BRUSSEL — Telefoon 18.31.60

BRIMAR

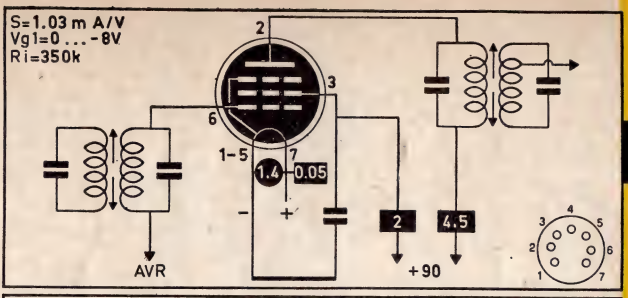
VALVES and TELETUBES

American Types

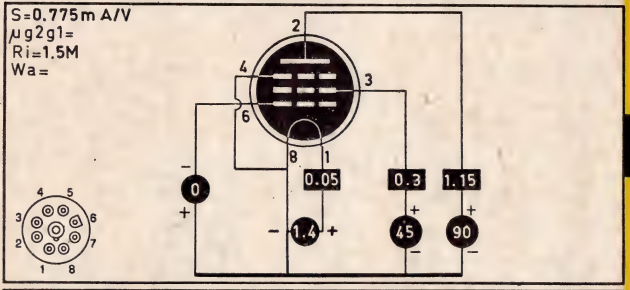
made in England

Sole Representatives in The Netherlands:

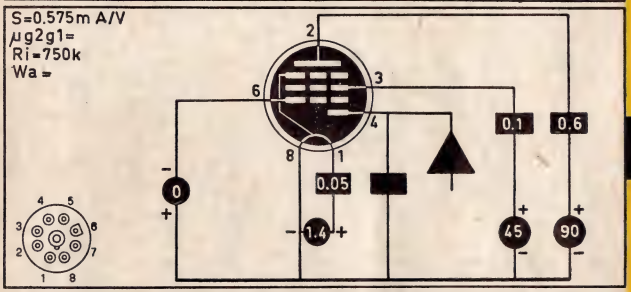
Nederlandsche Standard Electric Mij. N.V.
's-Gravenhage



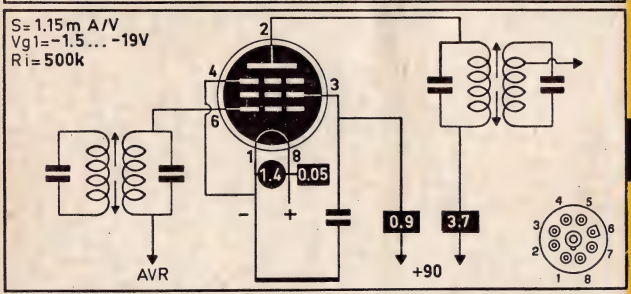
1L4



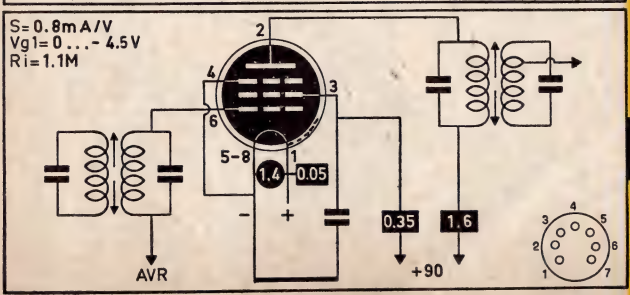
1LC5



1LD5



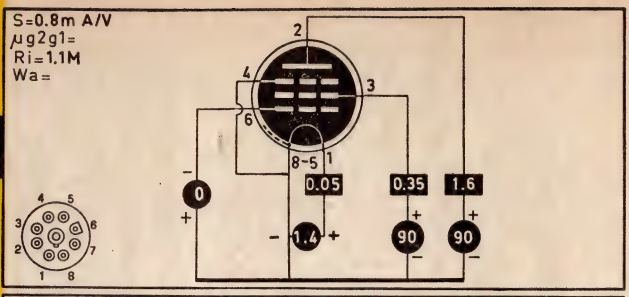
1LG5



1LN5

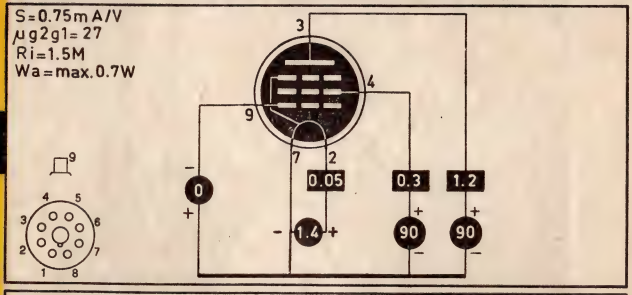
1LN5

S=0.8m A/V
μg2g1=
Ri=1.1M
Wa=



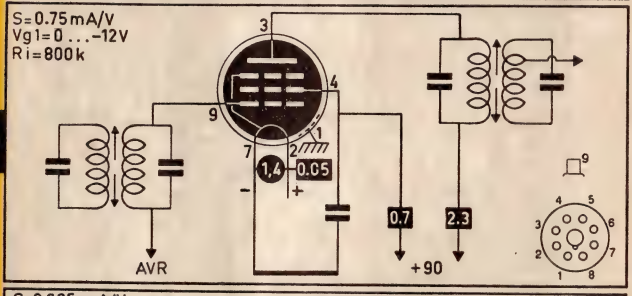
1N5

S=0.75mA/V
μg2g1=27
Ri=1.5M
Wa=max.0.7W



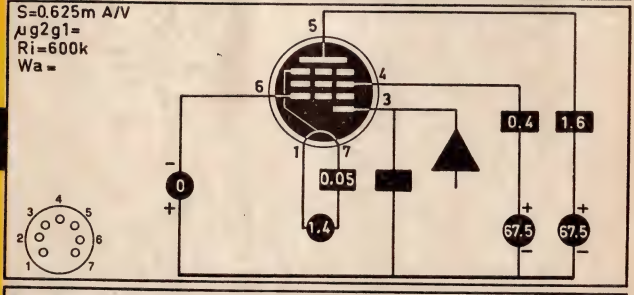
1P5

S=0.75mA/V
Vg1=0...-12V
Ri=800k



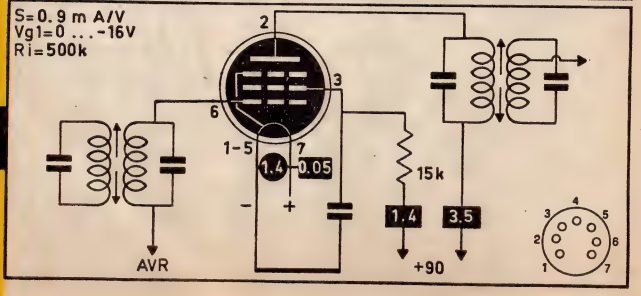
1S5

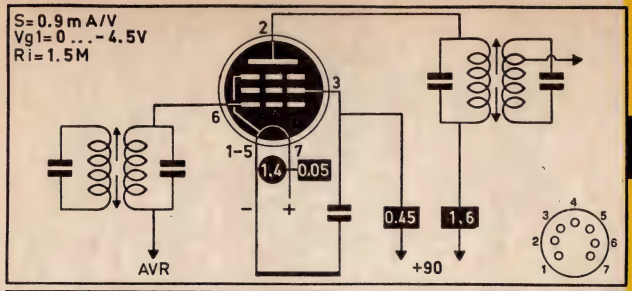
S=0.625m A/V
μg2g1=
Ri=600k
Wa=



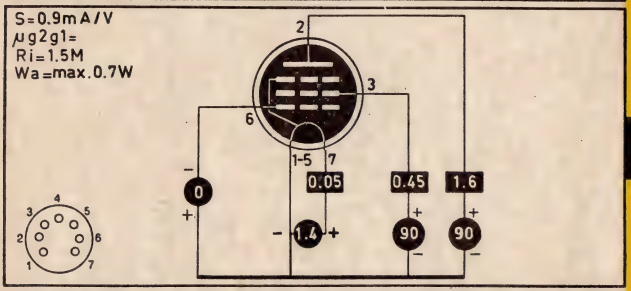
1T4

S=0.9 m A/V
Vg1=0...-16V
Ri=500k

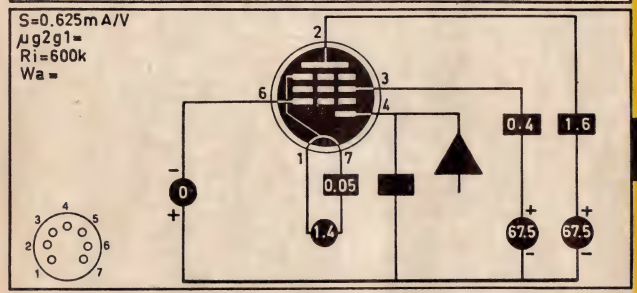




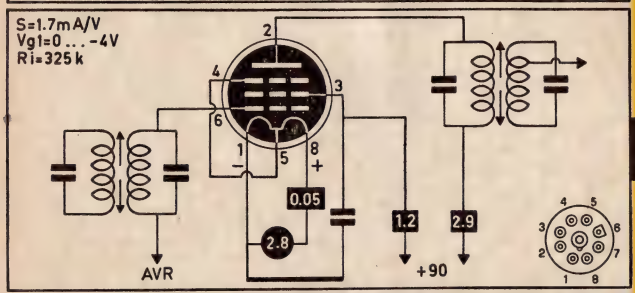
1U4



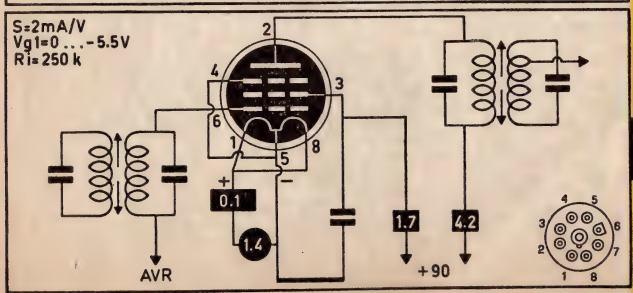
1U4



1U5

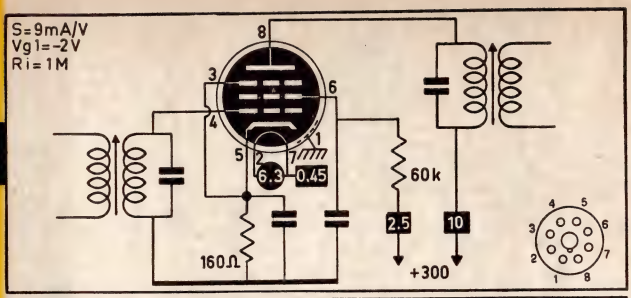


3E6

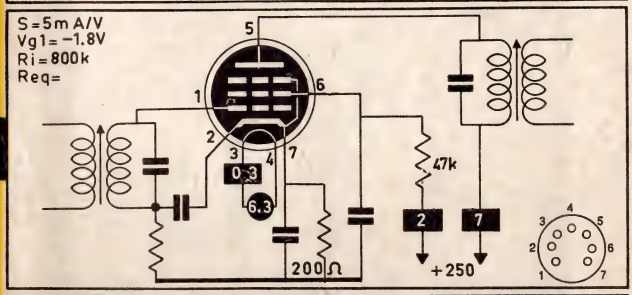


3E6

6AC7



6AG5



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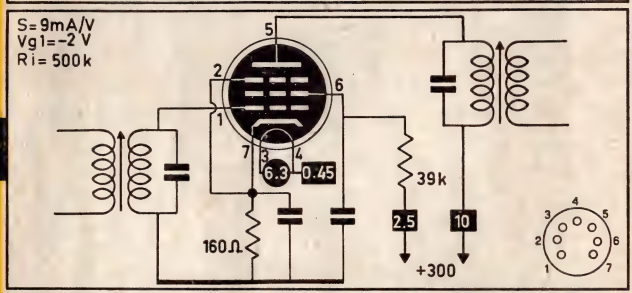

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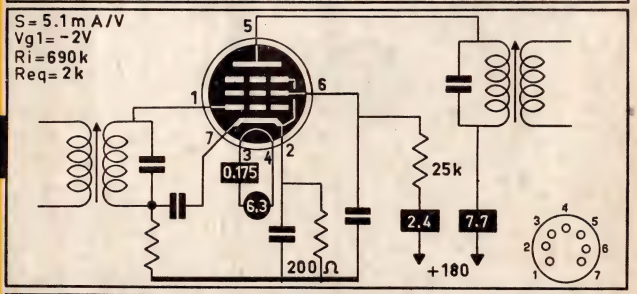

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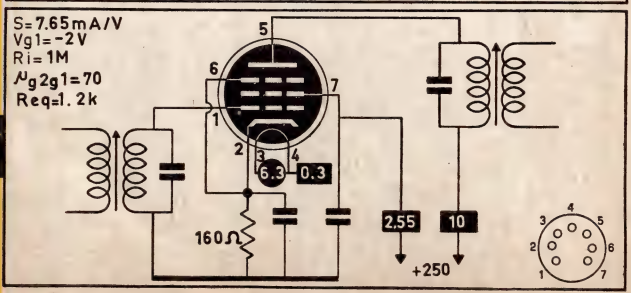

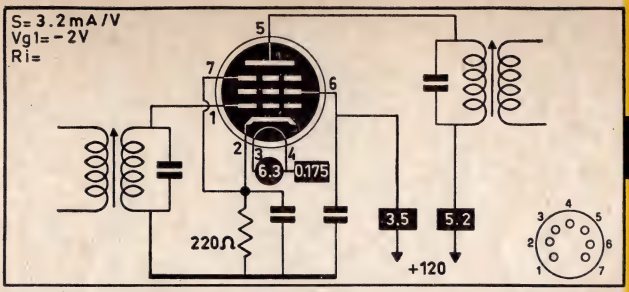

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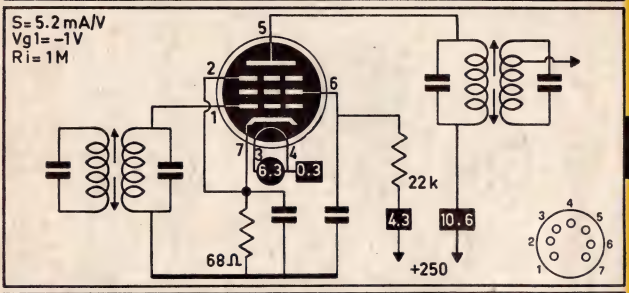
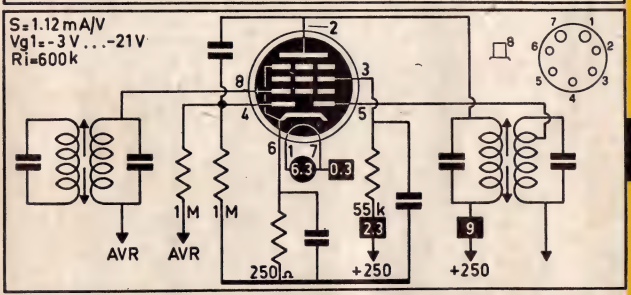
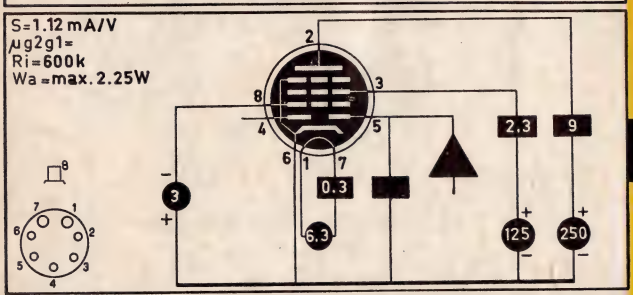


6AU6



6B7



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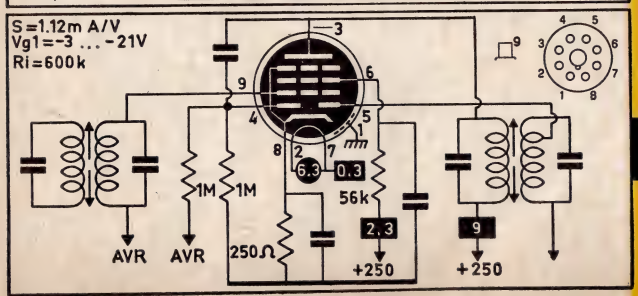
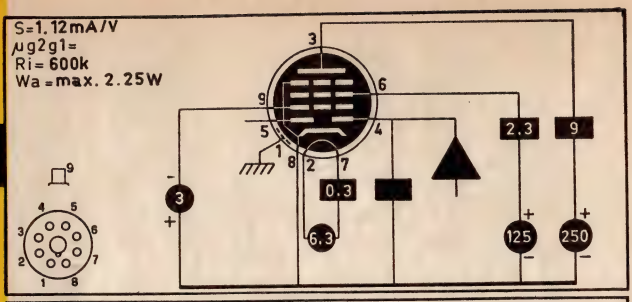


6B8

6B8



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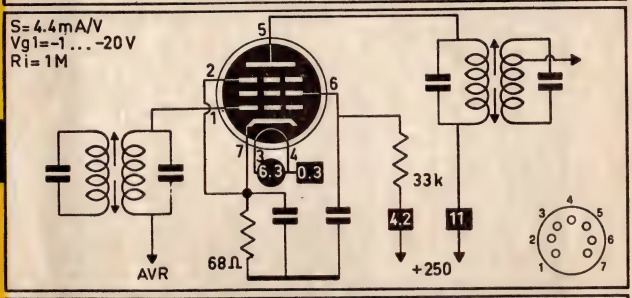

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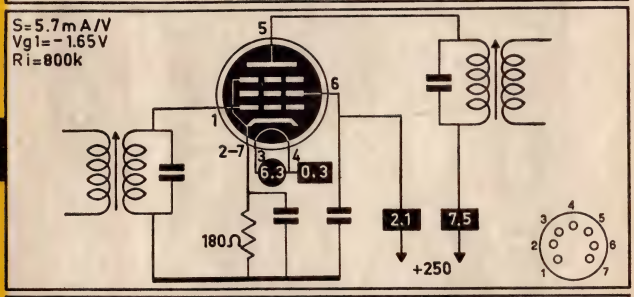
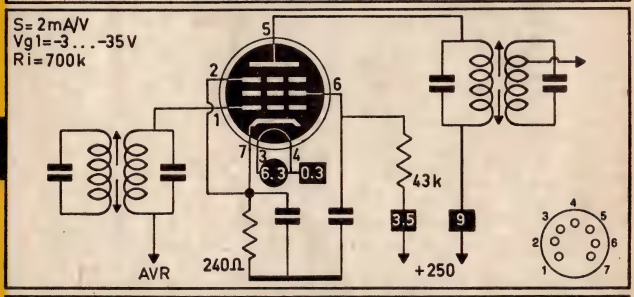


6BD6



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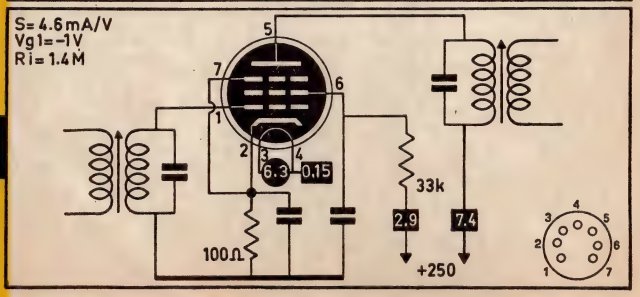
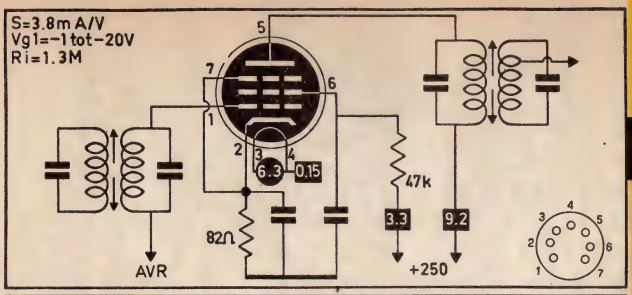


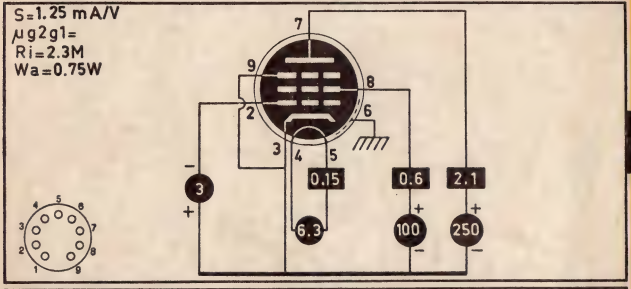
6BJ6

S=3.8mA/V
Vg1=-1tot-20V
Ri=1.3M



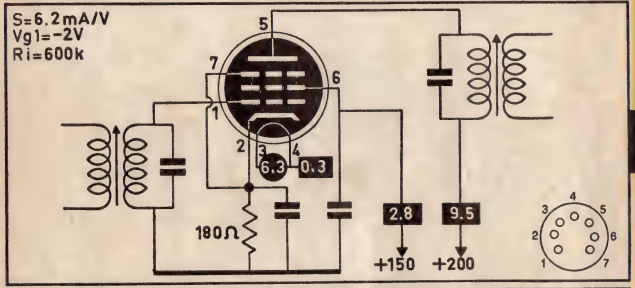
6BR7

S=1.25 mA/V
μg2g1=
Ri=2.3M
Wa=0.75W



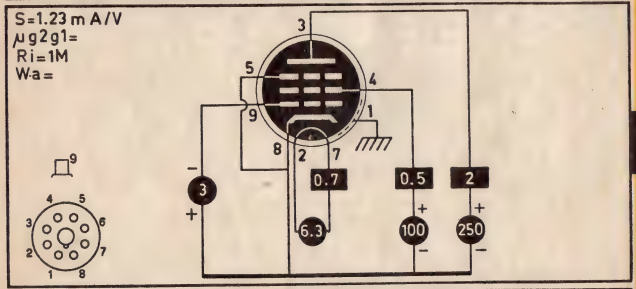
6CB6

S=6.2mA/V
Vg1=-2V
Ri=600k



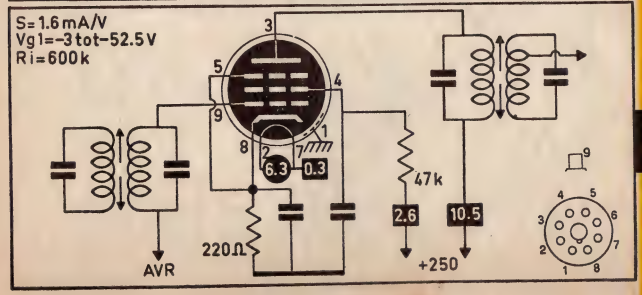
6J7

S=1.23 m A/V
μg2g1=
Ri=1M
Wa=

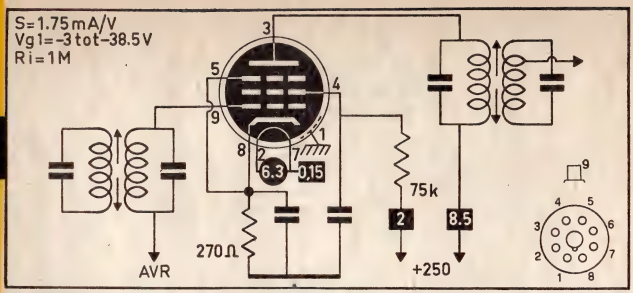


6K7

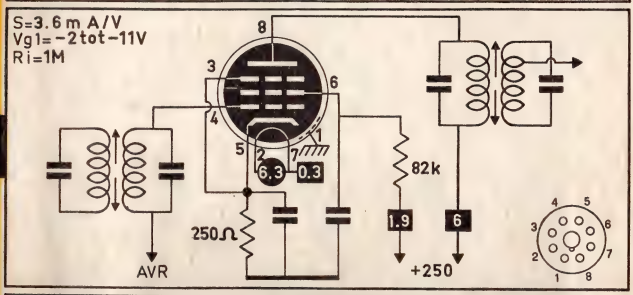
S=1.6mA/V
Vg1=-3tot-52.5V
Ri=600k



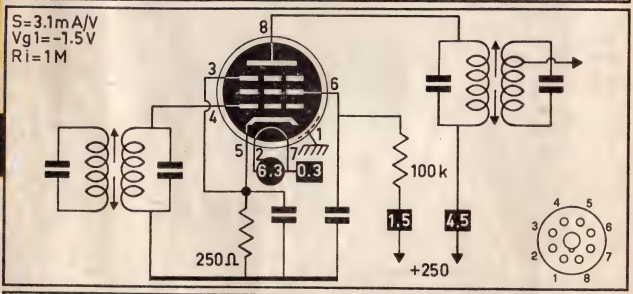
6S7



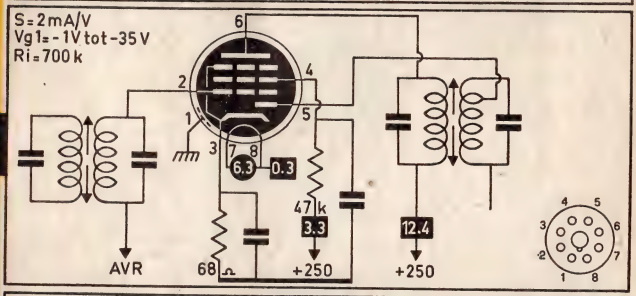
6SD7



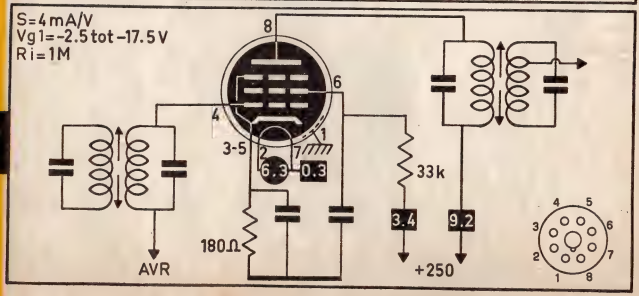
6SE7



6SF7



6SG7



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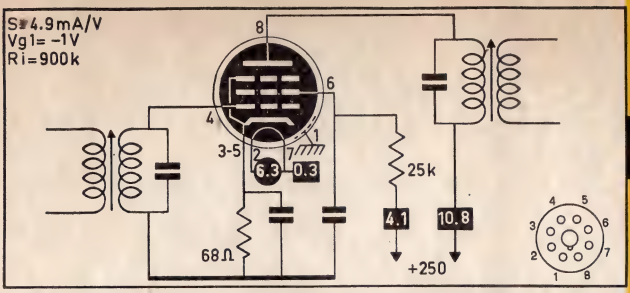
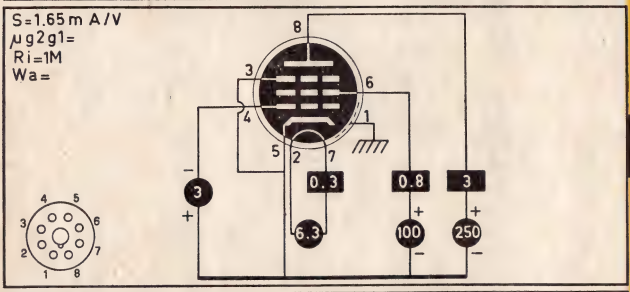


6SJ7



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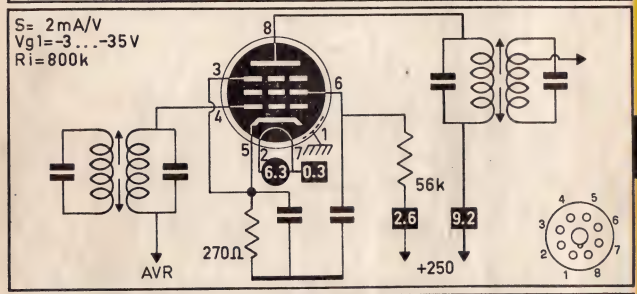
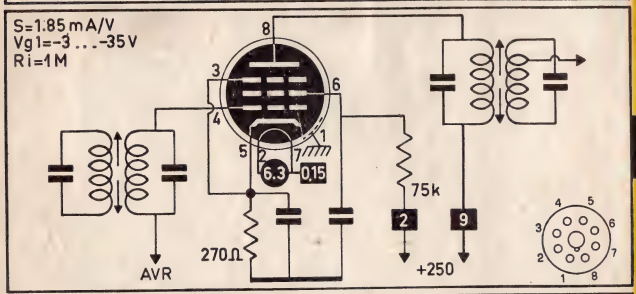
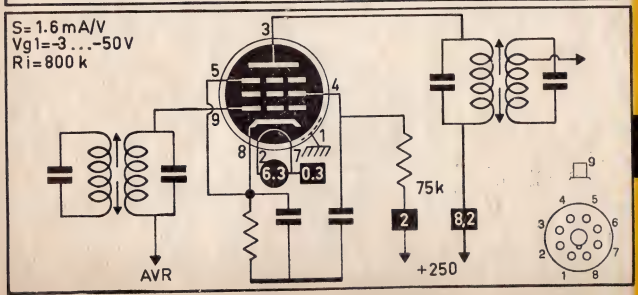


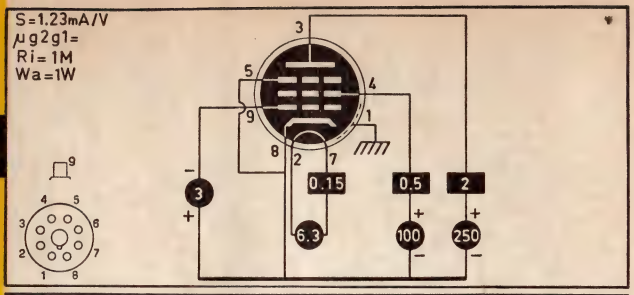
6SS7



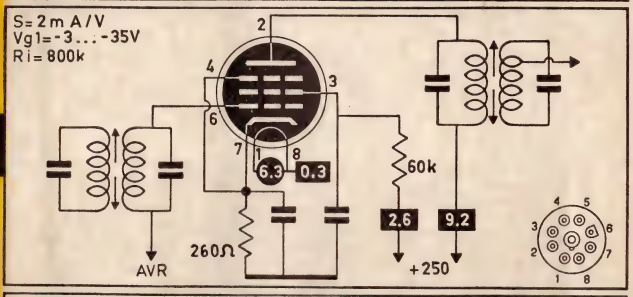
6U7



6W7



7A7



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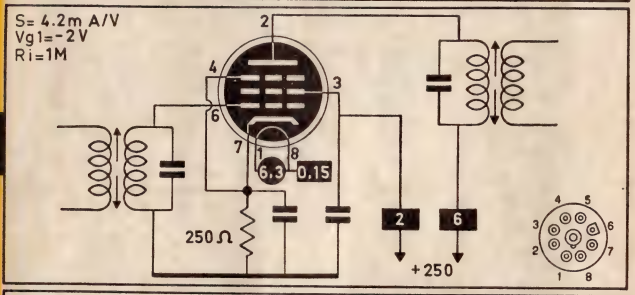
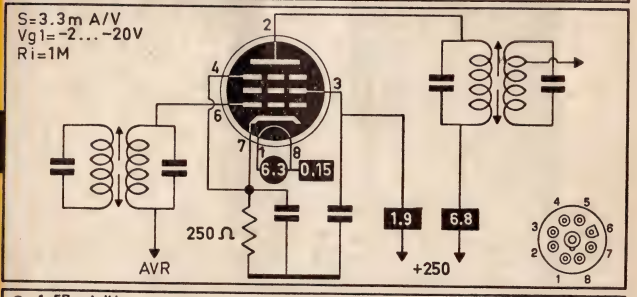
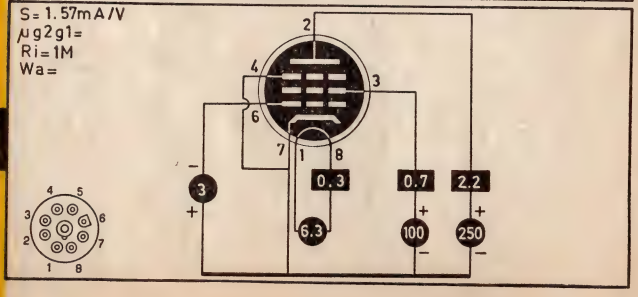
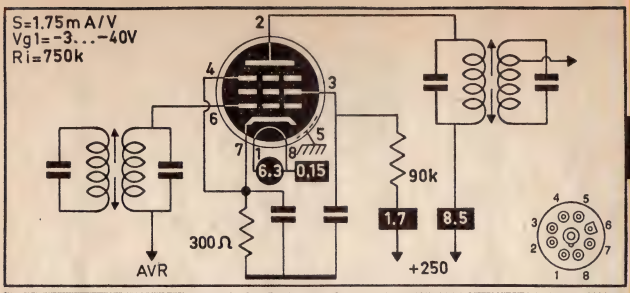


7AH7

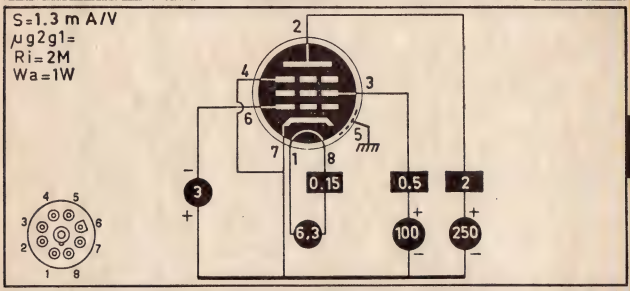


7AJ7

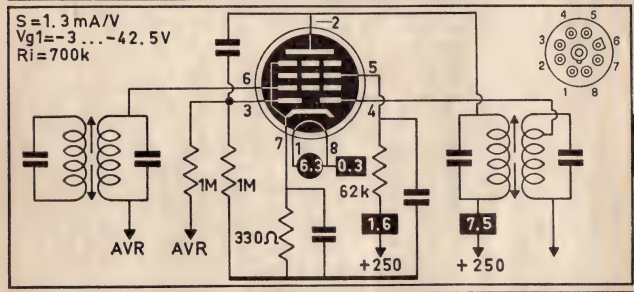




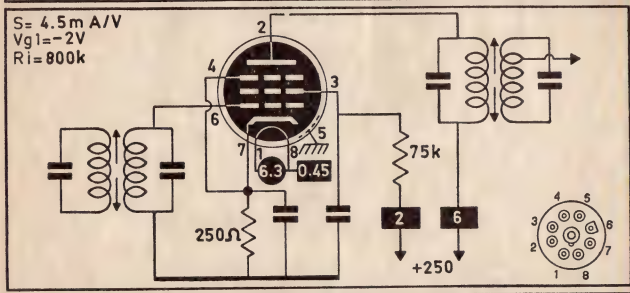
7B7



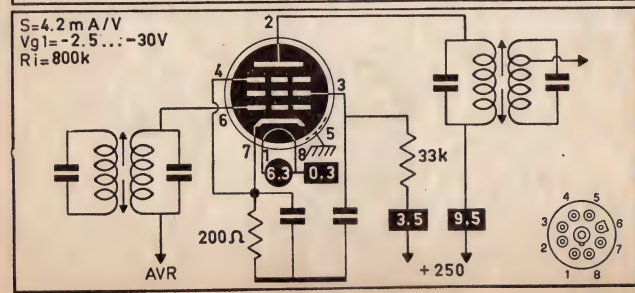
7C7



7E7

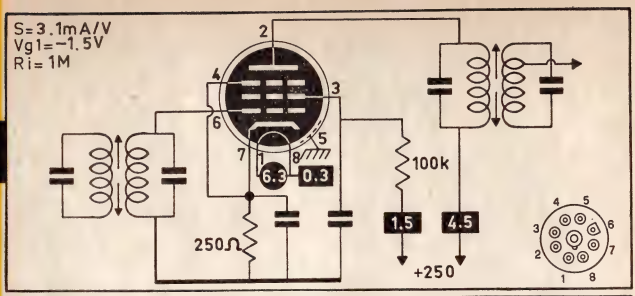


7G7

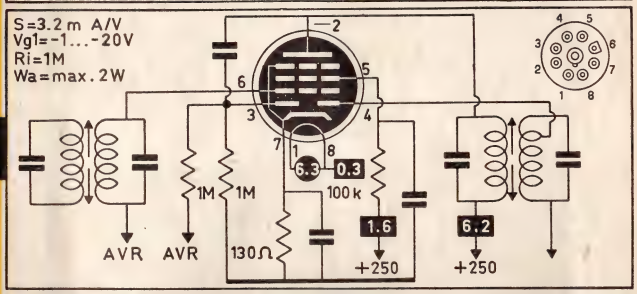


7H7

7L7



7R7



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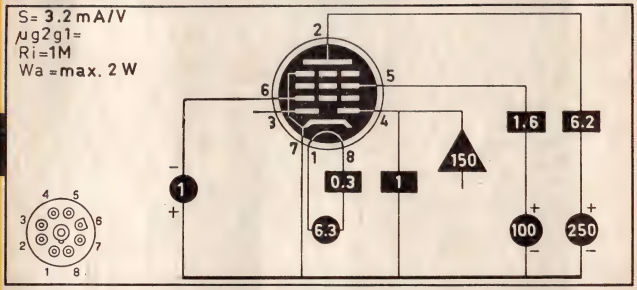
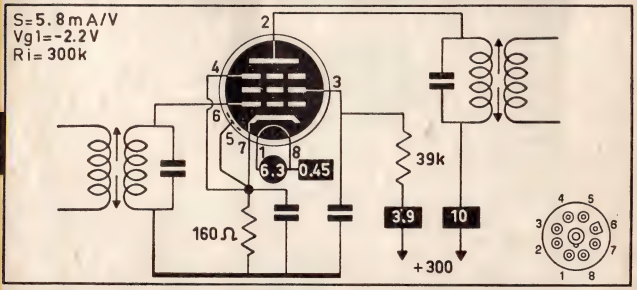
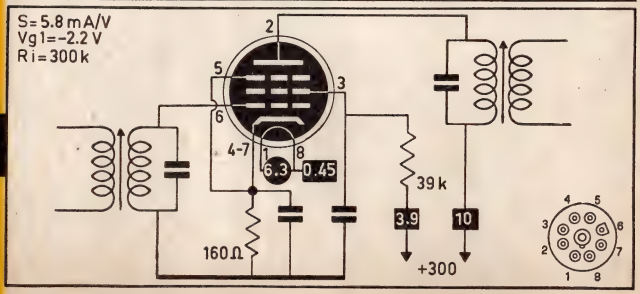


7V7

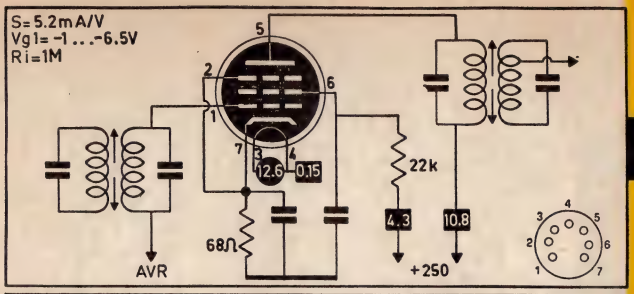


7W7



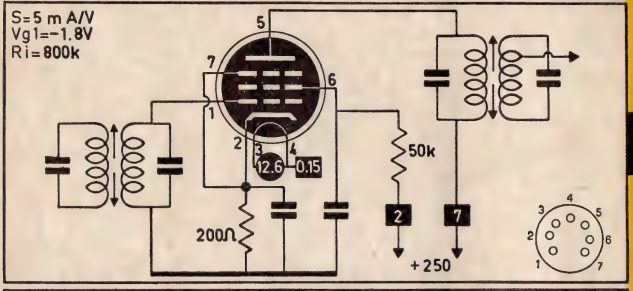
12AU6

S=5.2mA/V
Vg1=-1...-6.5V
Ri=1M



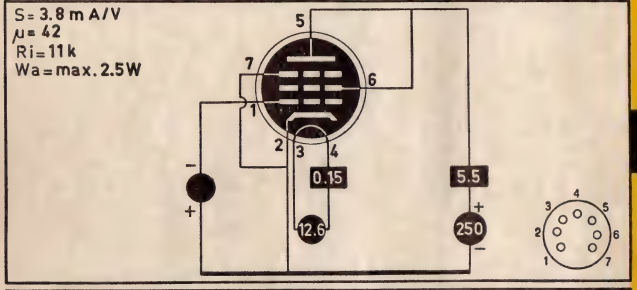
12AW6

S=5 mA/V
Vg1=-1.8V
Ri=800k



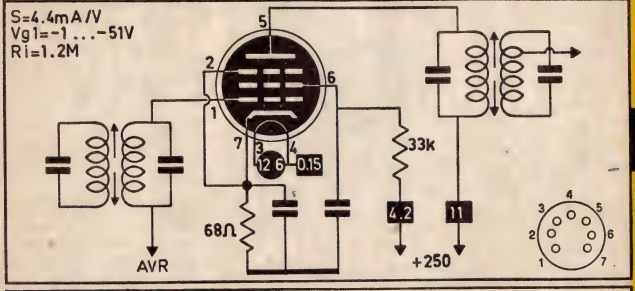
12AW6

S=3.8 mA/V
μ=42
Ri=11k
Wa=max. 2.5W



12BA6

S=4.4mA/V
Vg1=-1...-51V
Ri=1.2M



12BD6

S=2mA/V
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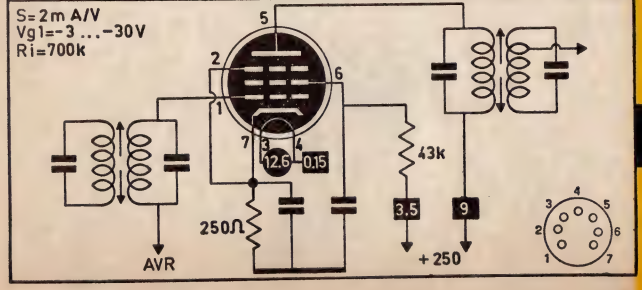
Ri=700k



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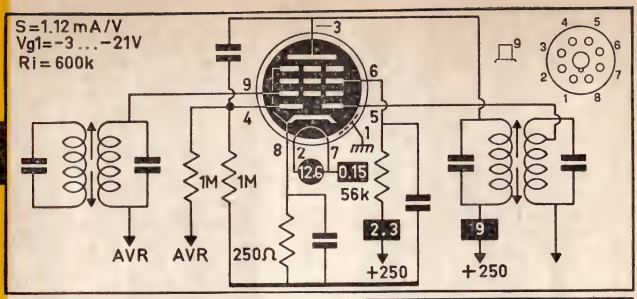

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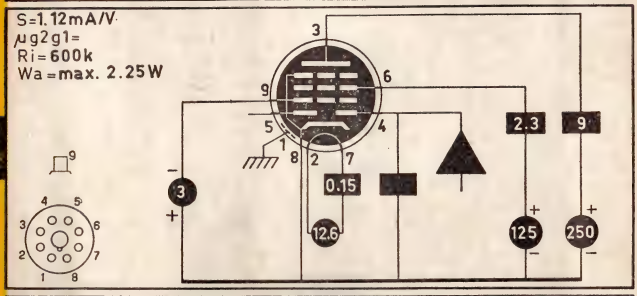

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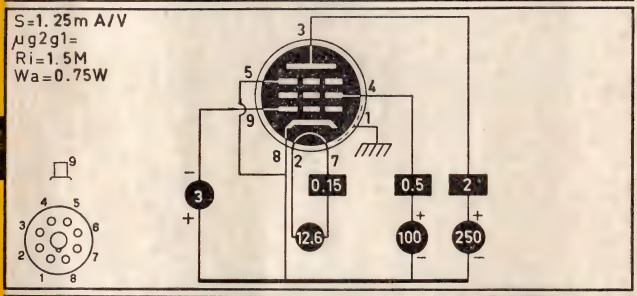

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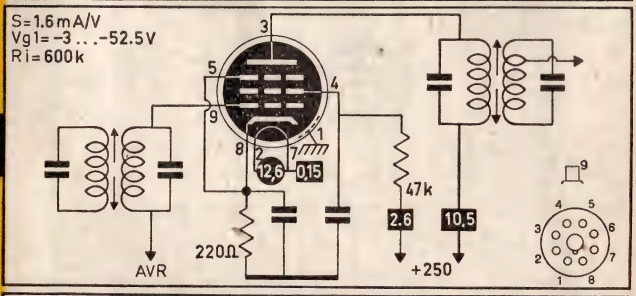

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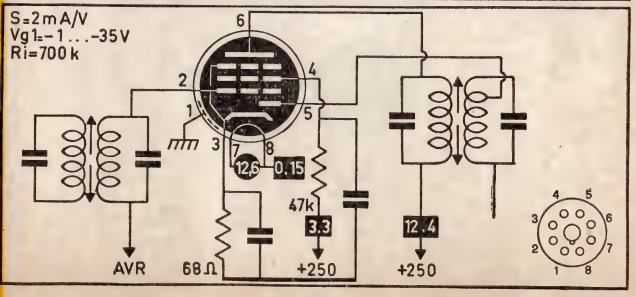

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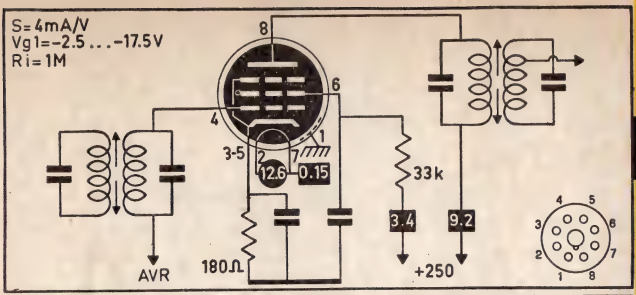

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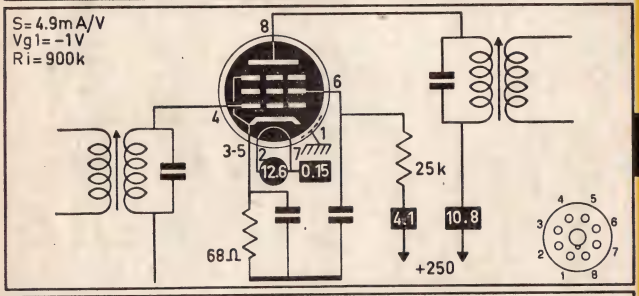

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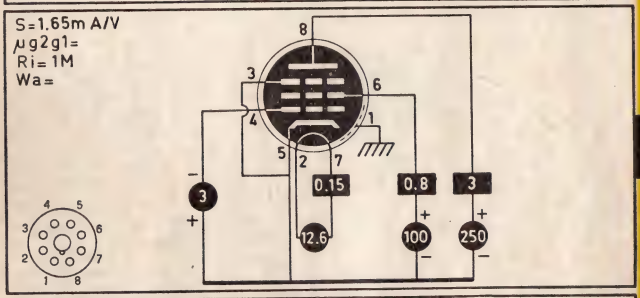

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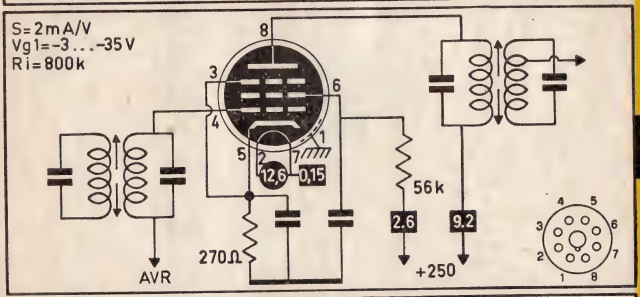

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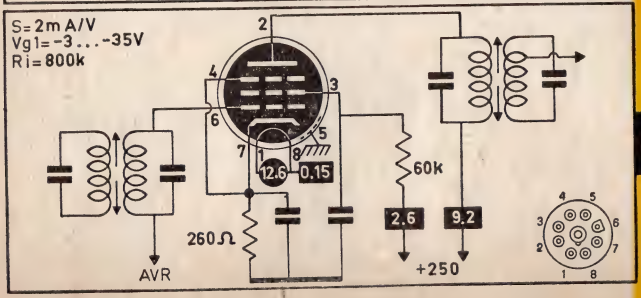

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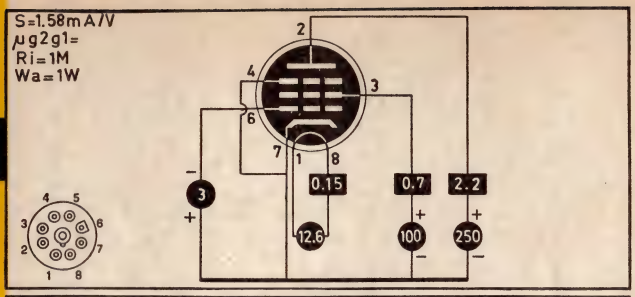

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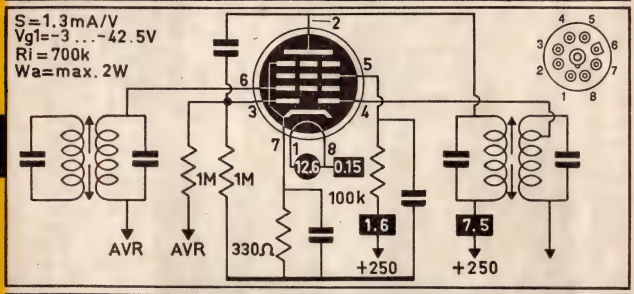

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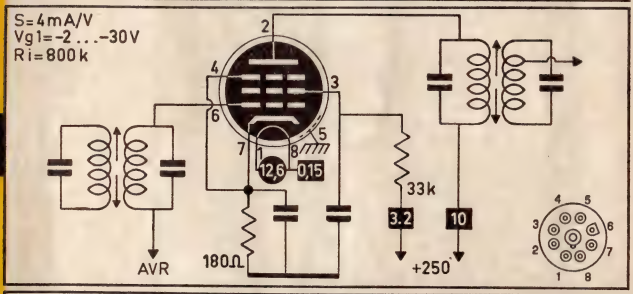

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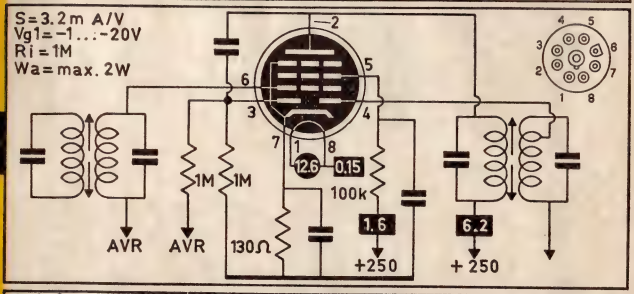

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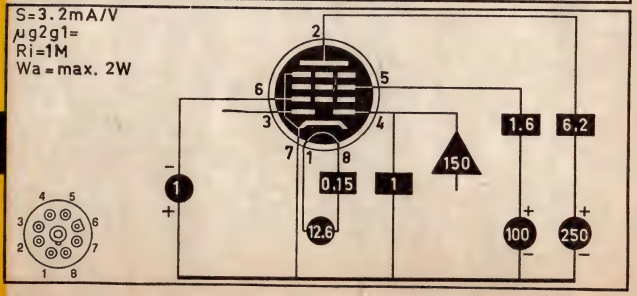

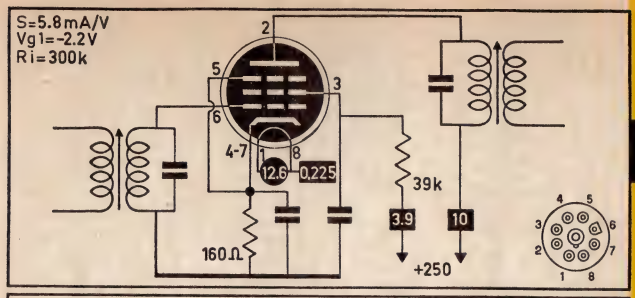

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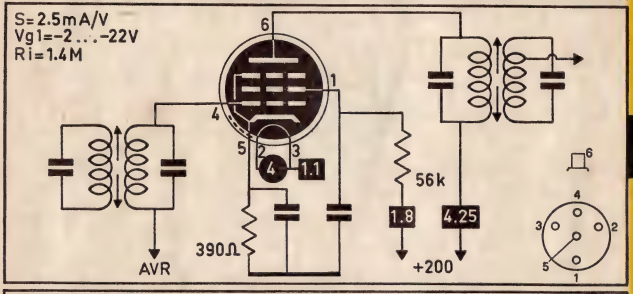

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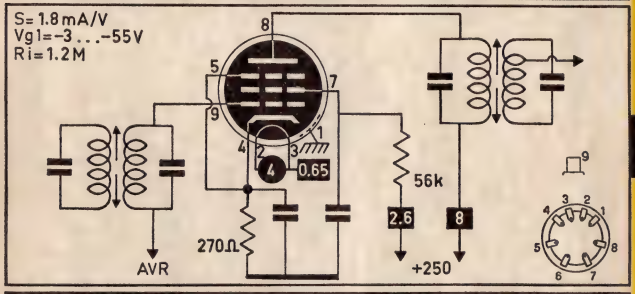

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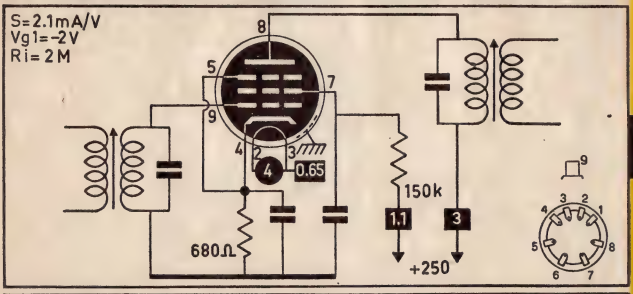

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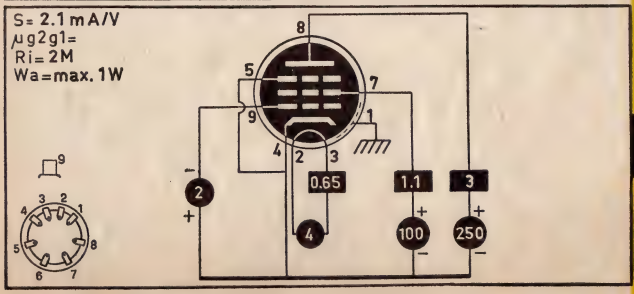

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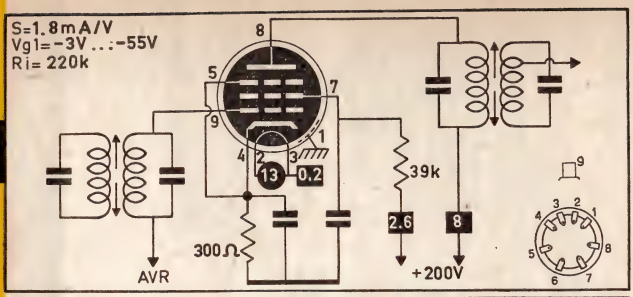

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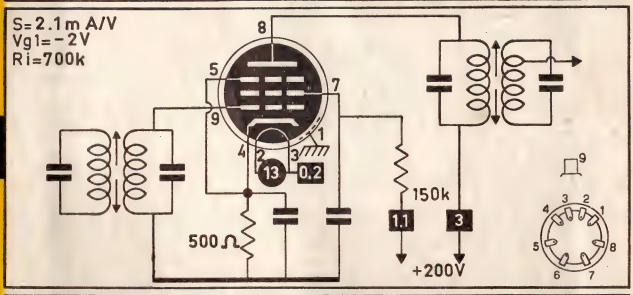

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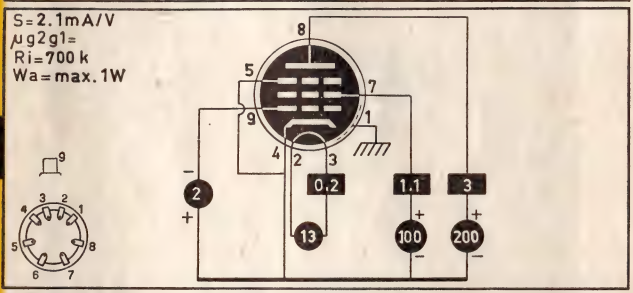

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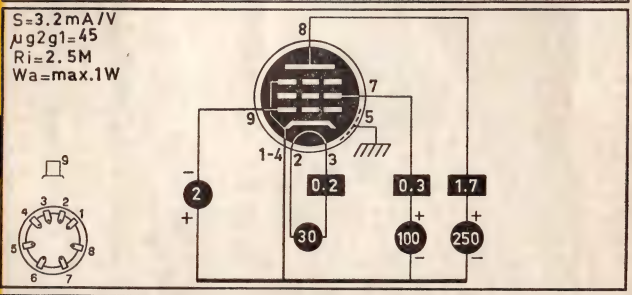

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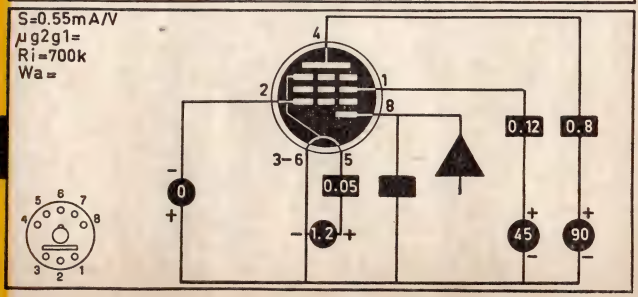

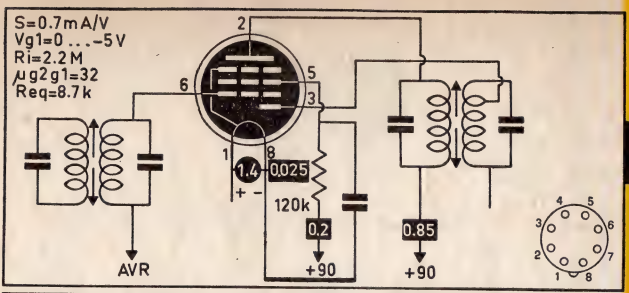

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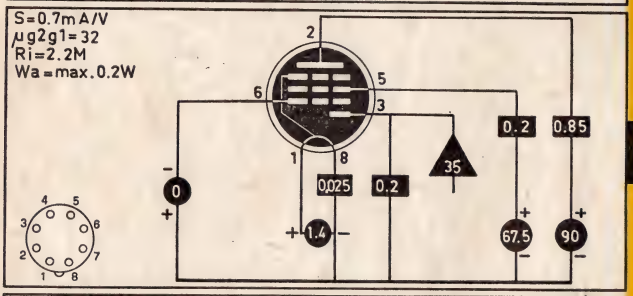

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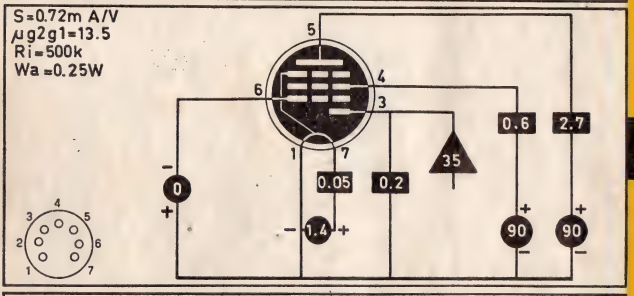

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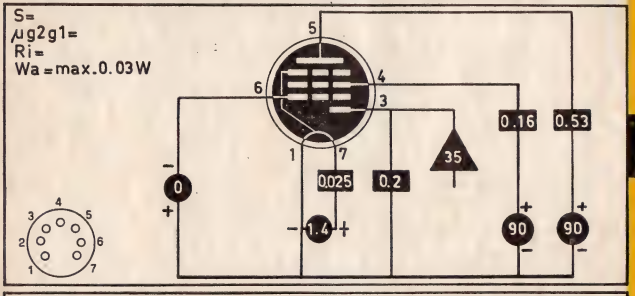

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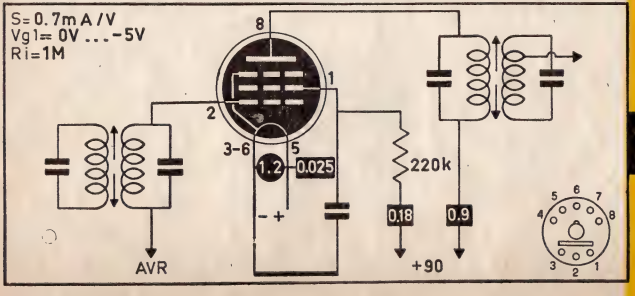

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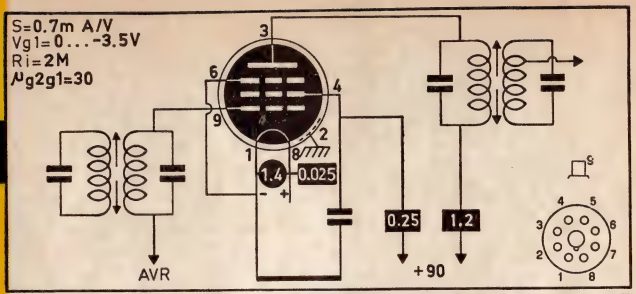

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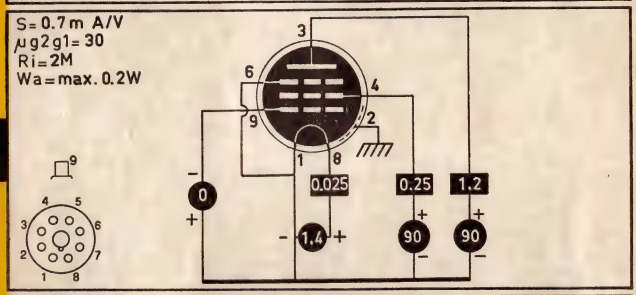

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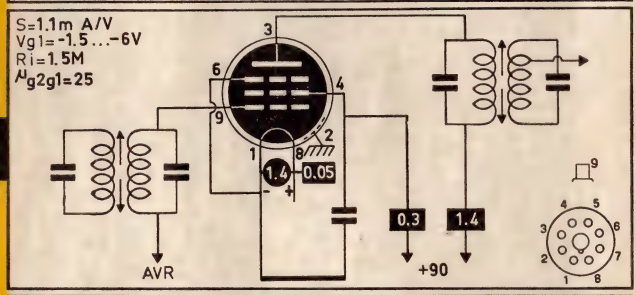

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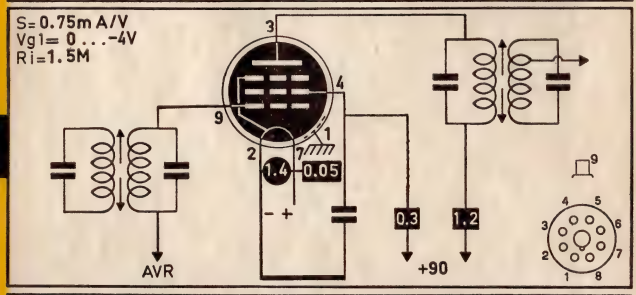

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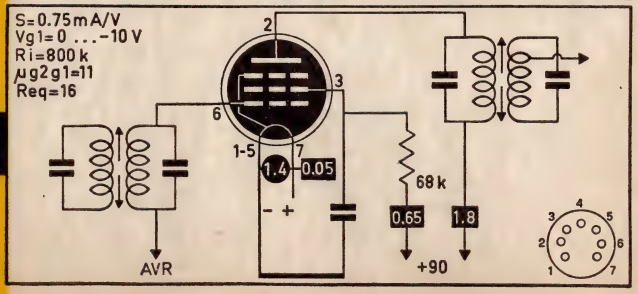

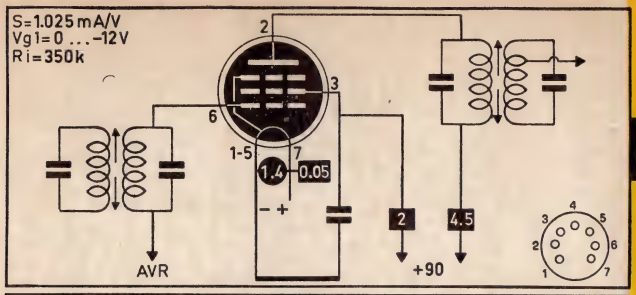

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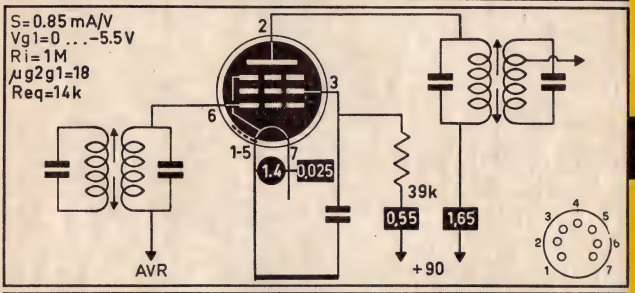

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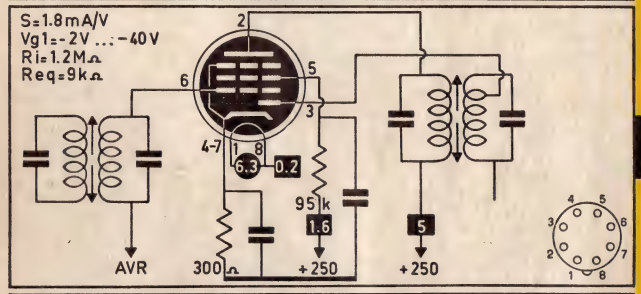

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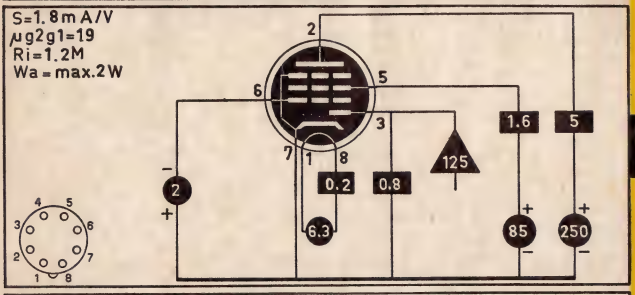

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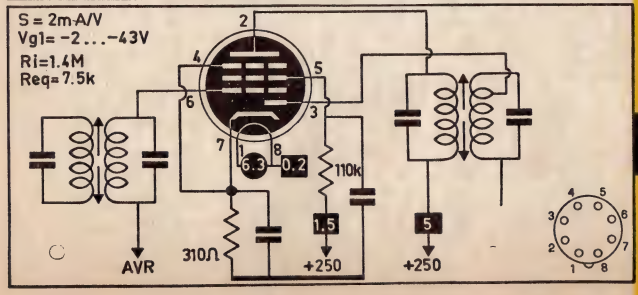

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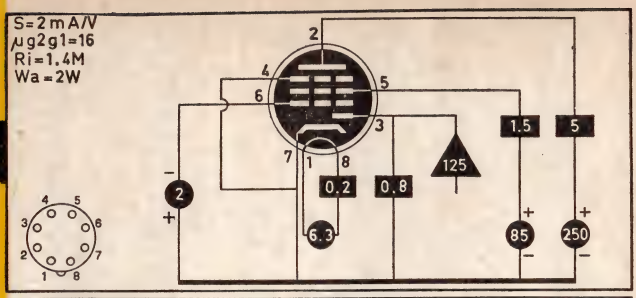

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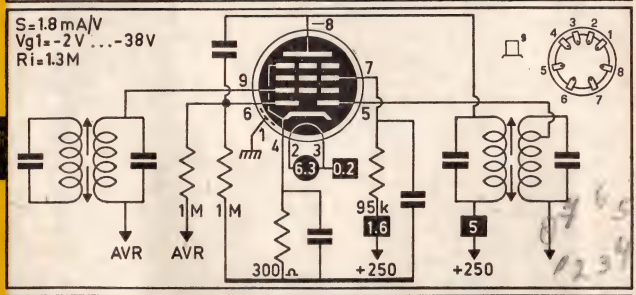

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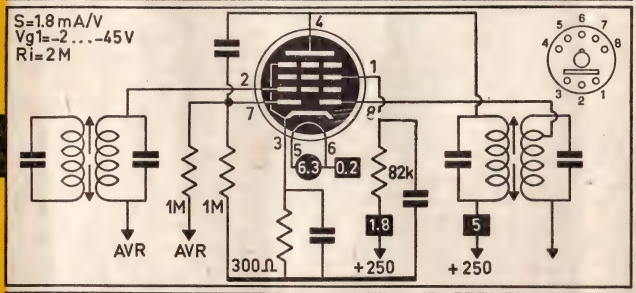

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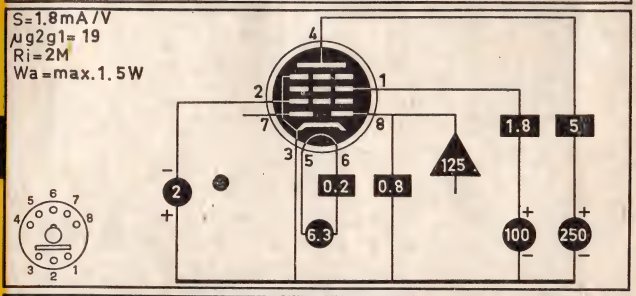

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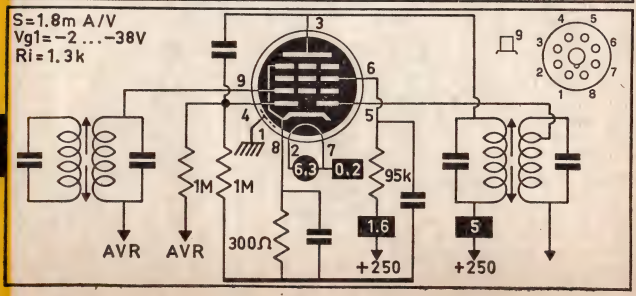

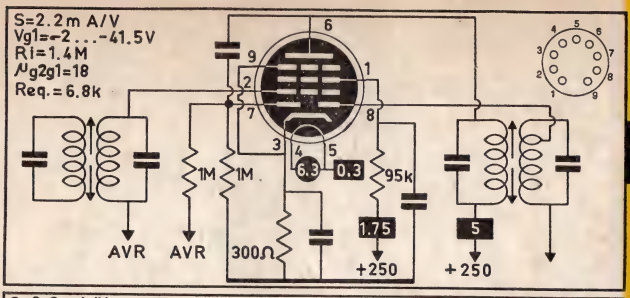

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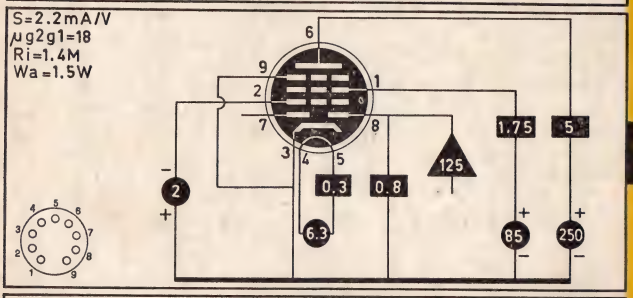

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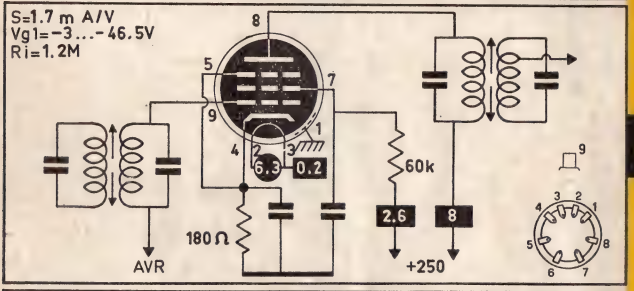

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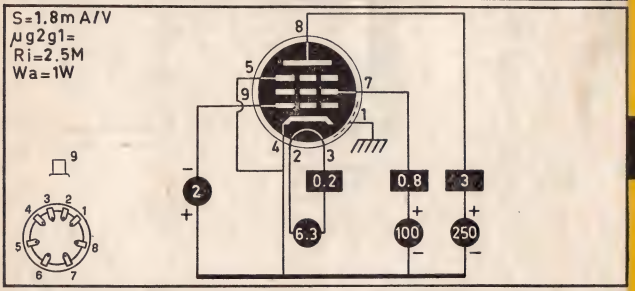

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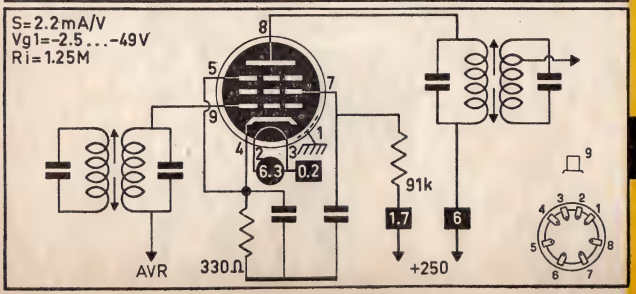
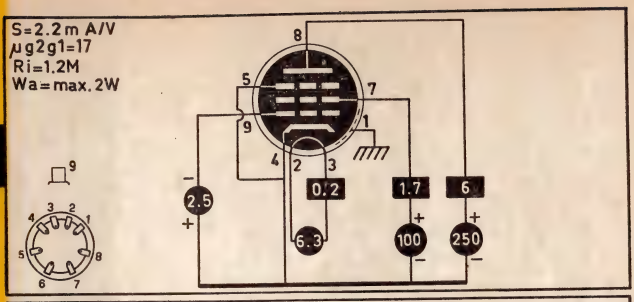


EF9

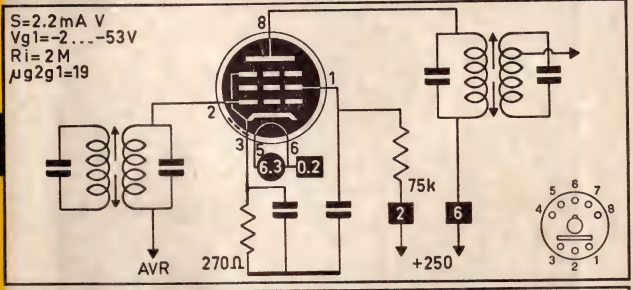
EF9

S=2.2 m A/V
μg2g1=17
Ri=1.2M
Wa=max. 2W



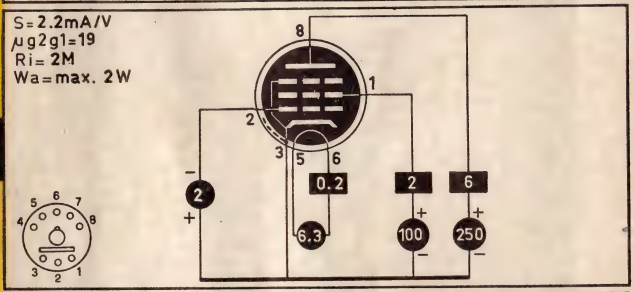
EF11

S=2.2mA V
Vg1=-2...-53V
Ri= 2M
μg2g1=19



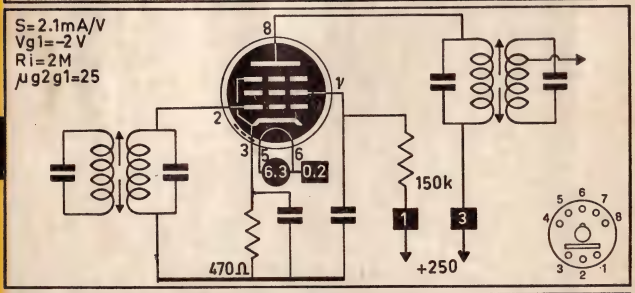
EF11

S= 2.2mA/V
μg2g1=19
Ri= 2M
Wa=max. 2W



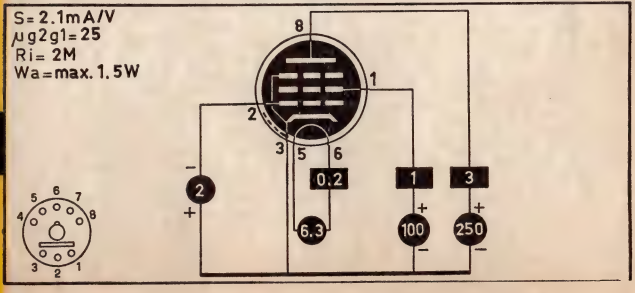
EF12

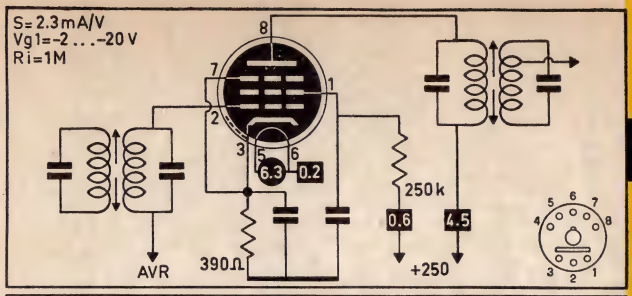
S=2.1mA/V
Vg1=-2 V
Ri=2M
μg2g1=25



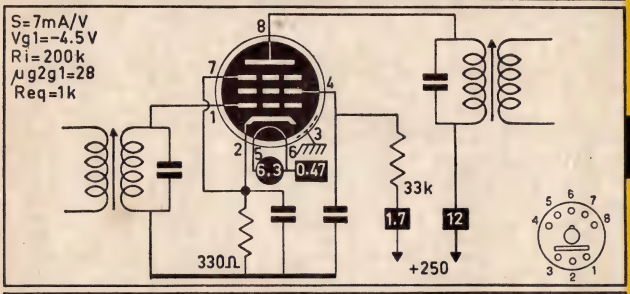
EF12

S= 2.1mA/V
μg2g1= 25
Ri= 2M
Wa=max. 1.5W





EF13



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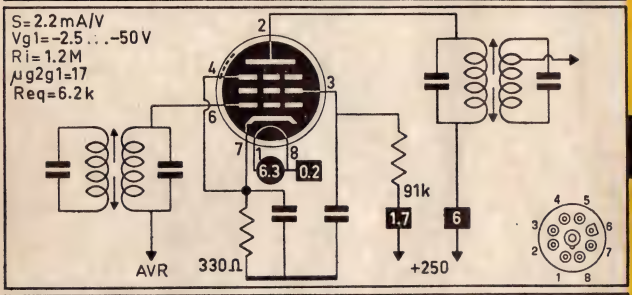

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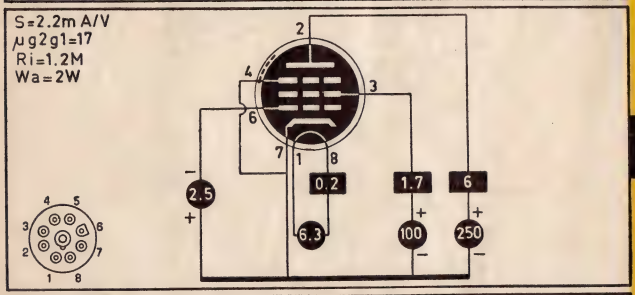

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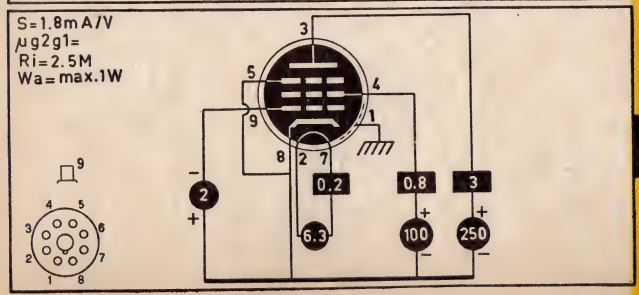

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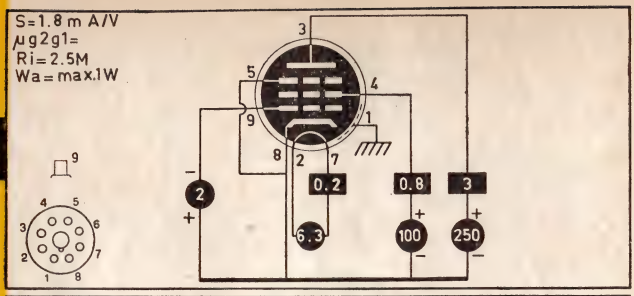

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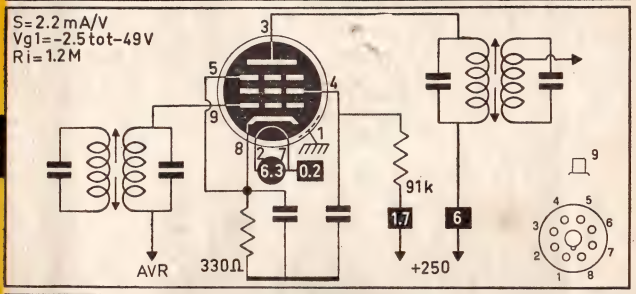

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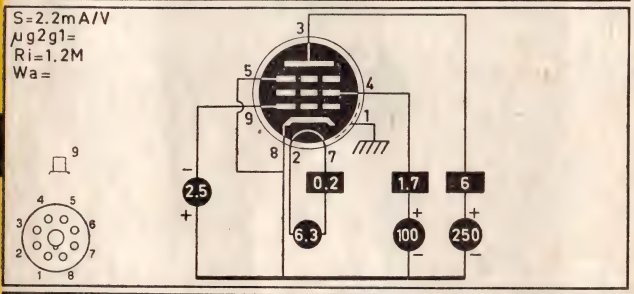

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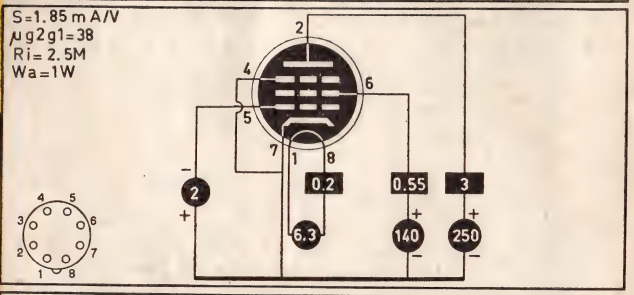

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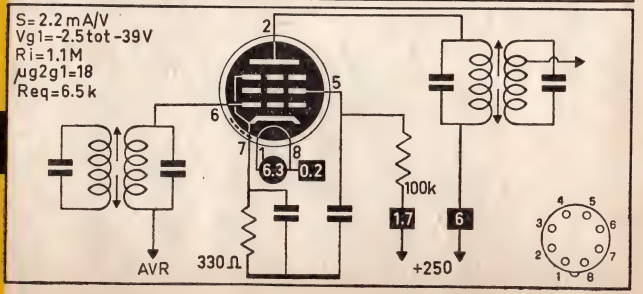
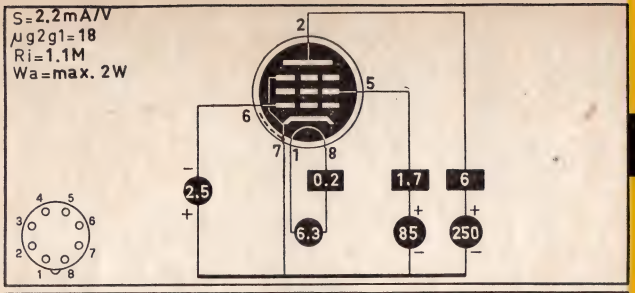


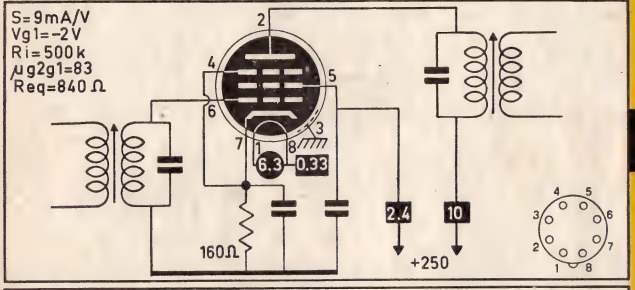
EF41

S=2.2mA/V
μg2g1=18
Ri=1.1M
Wa=max. 2W



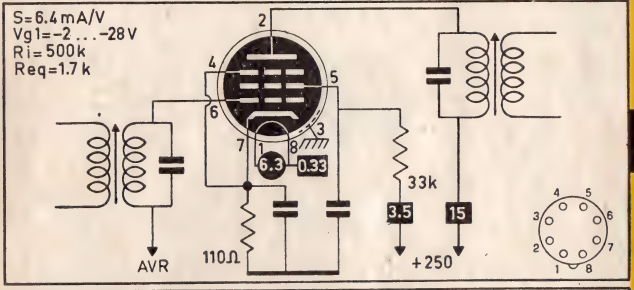
EF42

S=9mA/V
Vg1=-2V
Ri=500k
μg2g1=83
Req=840Ω



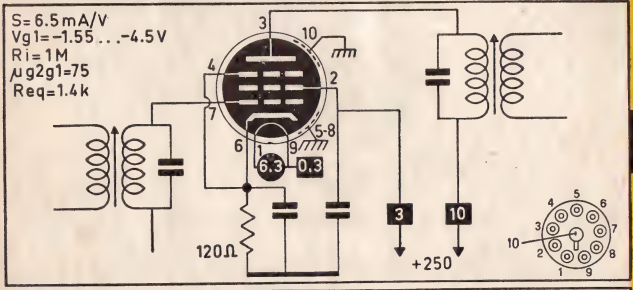
EF43

S=6.4mA/V
Vg1=-2...-28V
Ri=500k
Req=1.7k



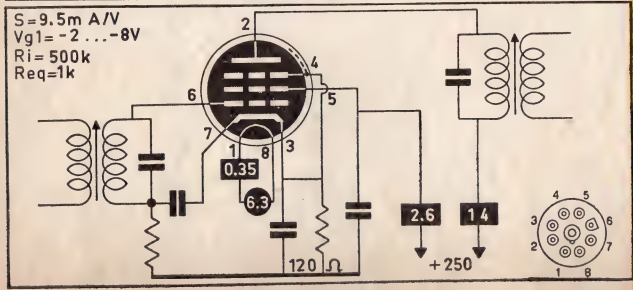
EF50

S=6.5mA/V
Vg1=-1.55...-4.5V
Ri=1M
μg2g1=75
Req=1.4k



EF51

S=9.5m A/V
Vg1=-2...-8V
Ri=500k
Req=1k



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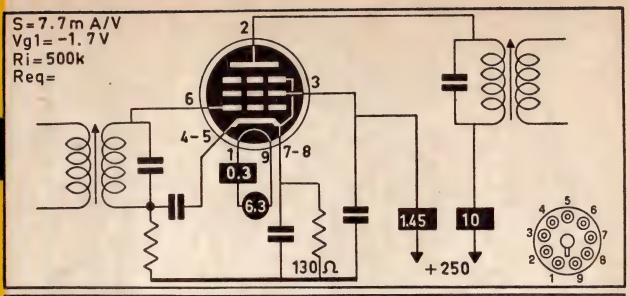

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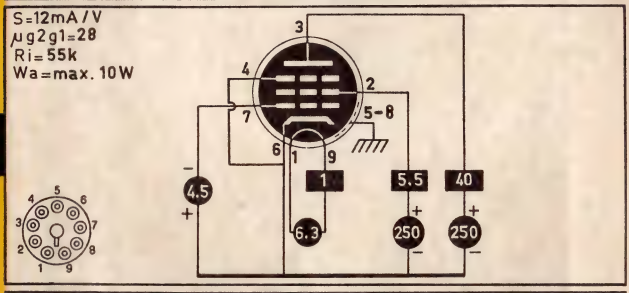

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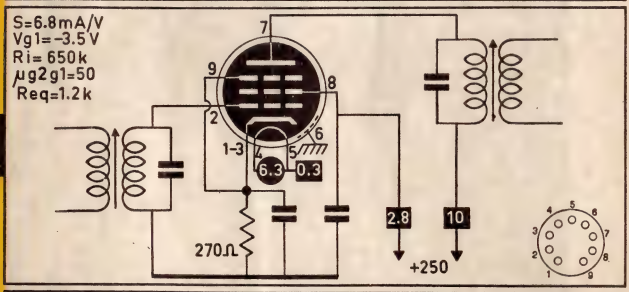

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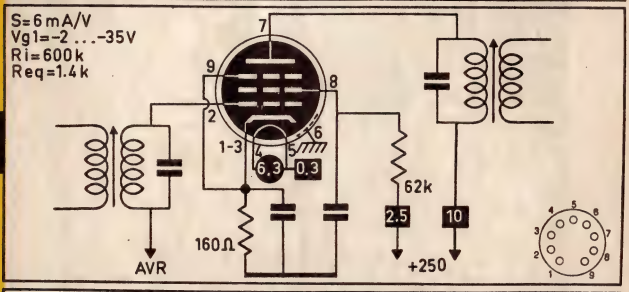

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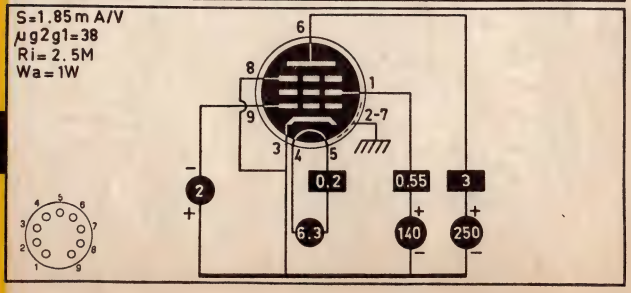

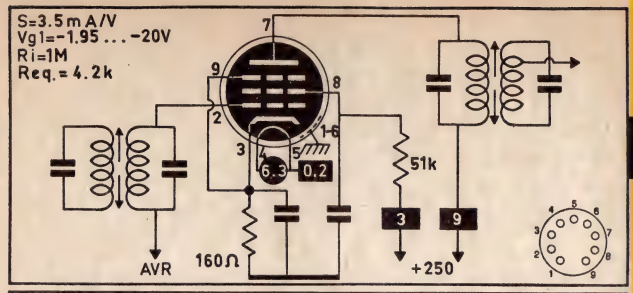

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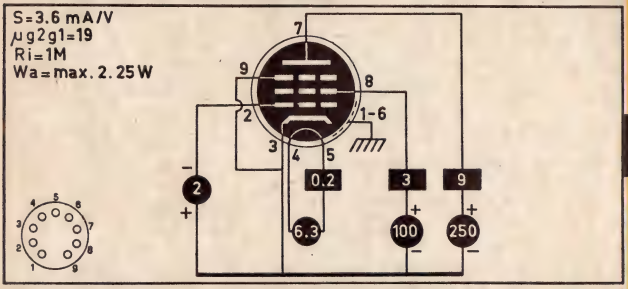

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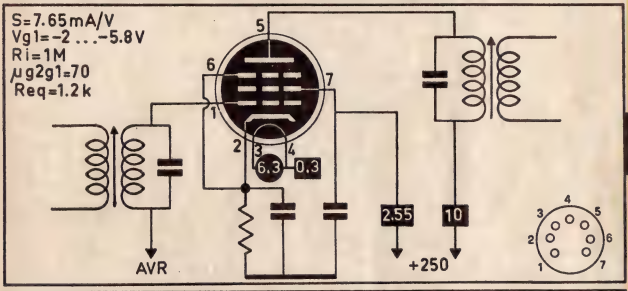

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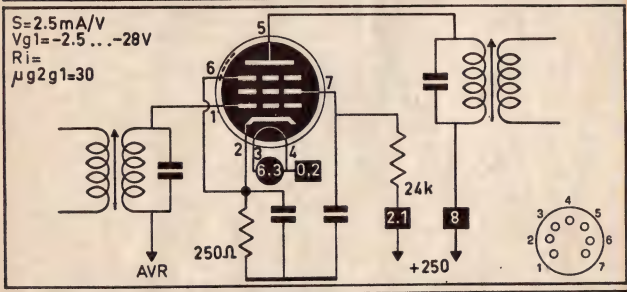

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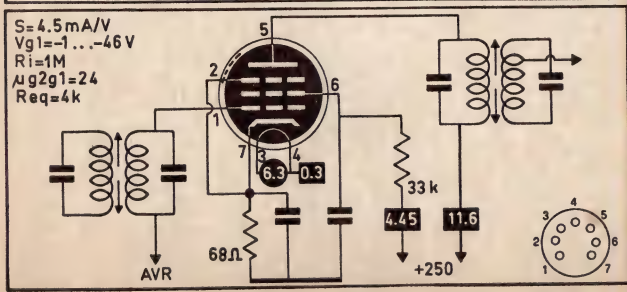

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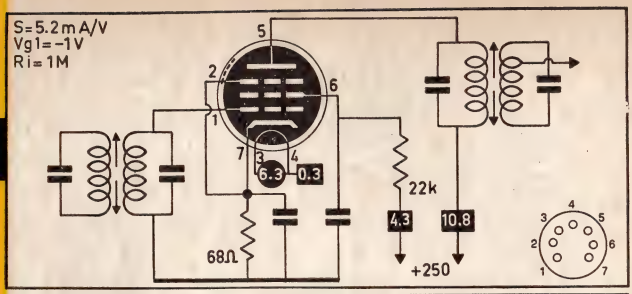
EF94



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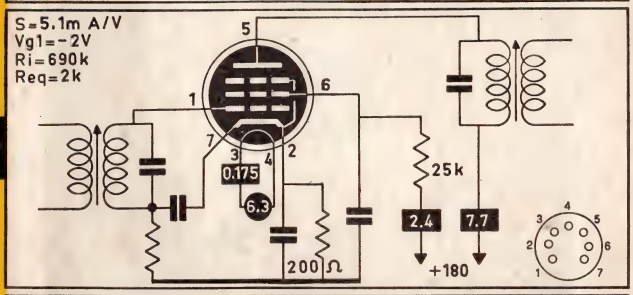

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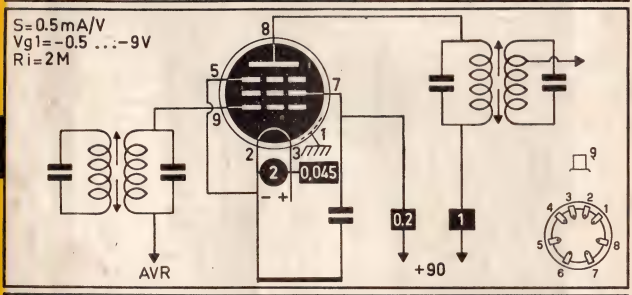

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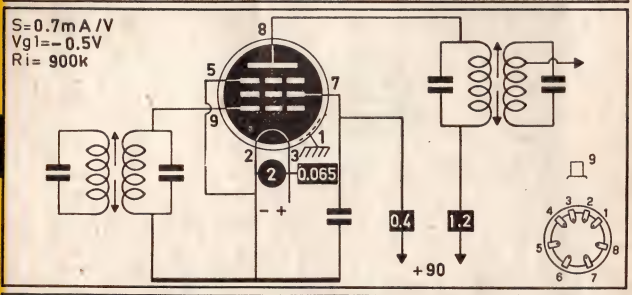

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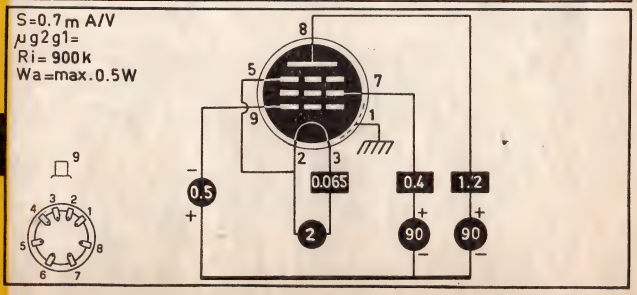

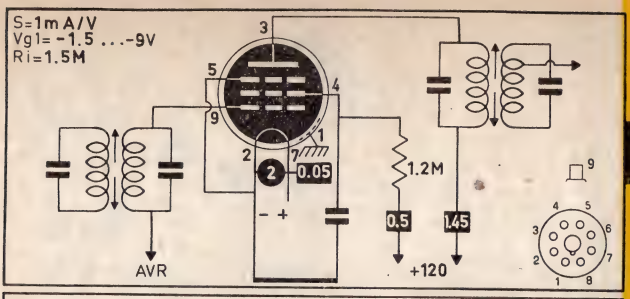

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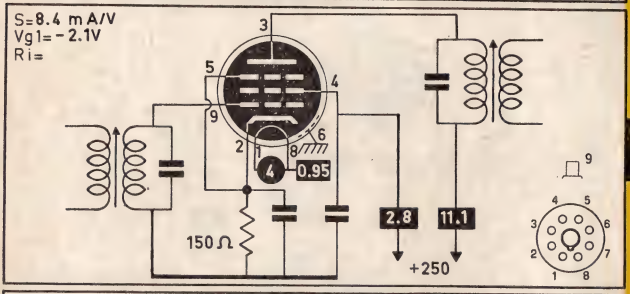

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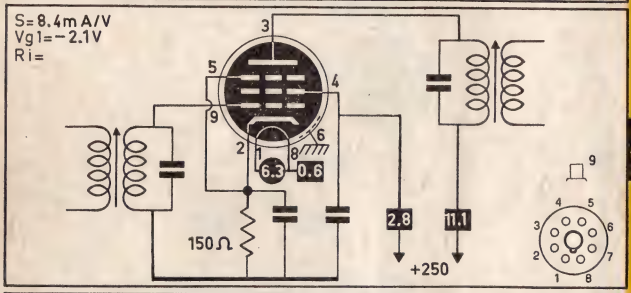

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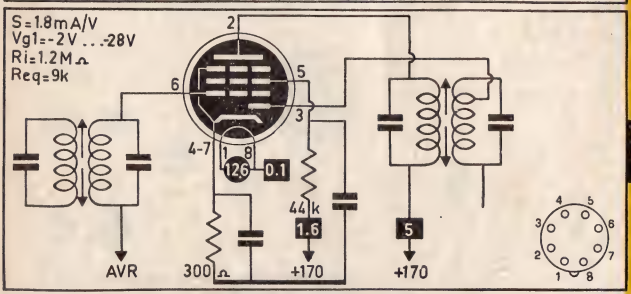

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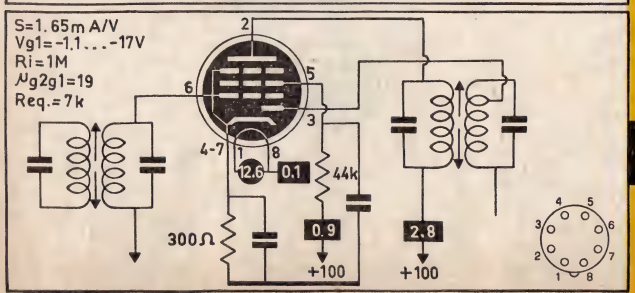

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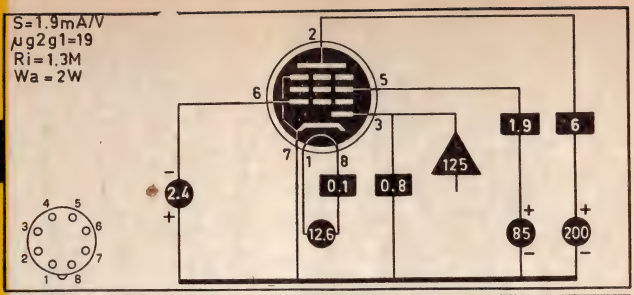

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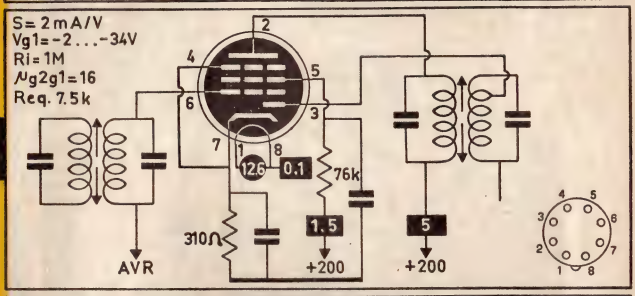

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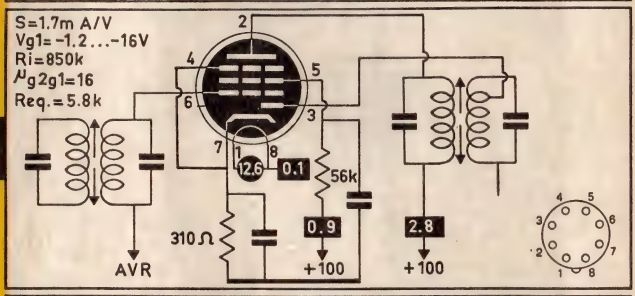

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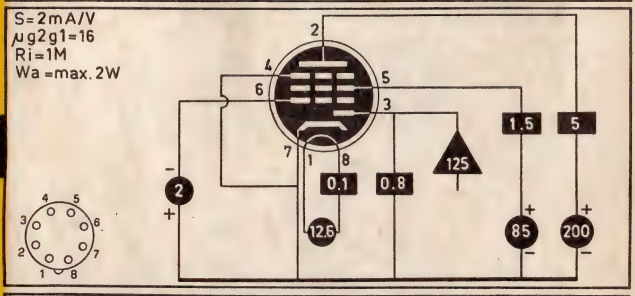

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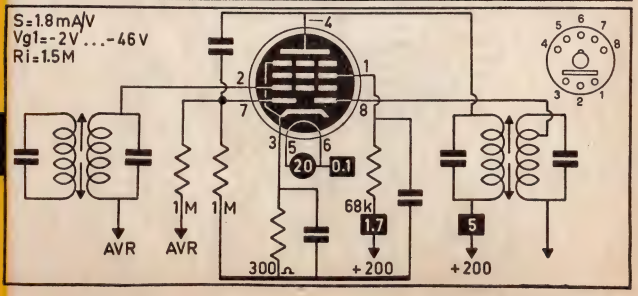

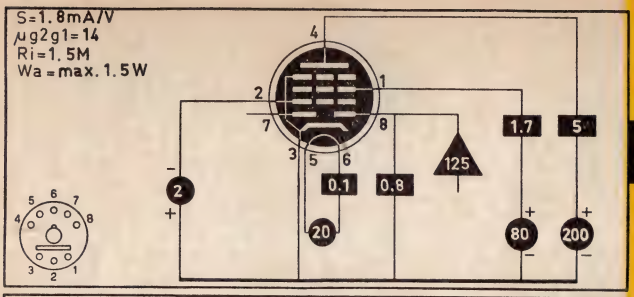

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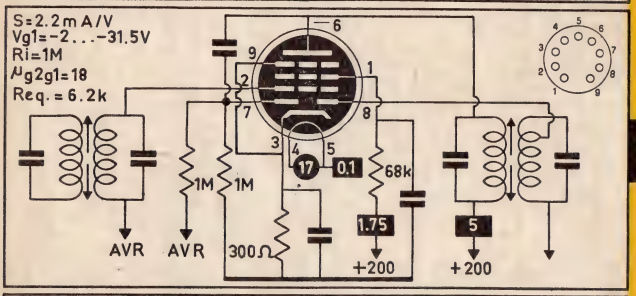

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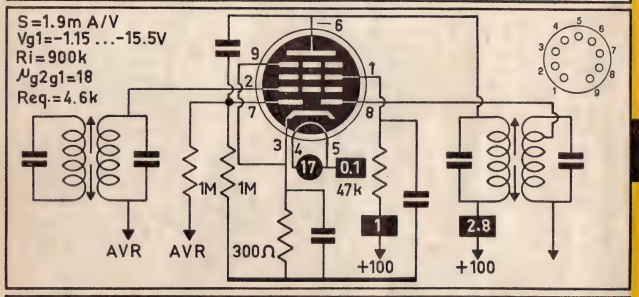

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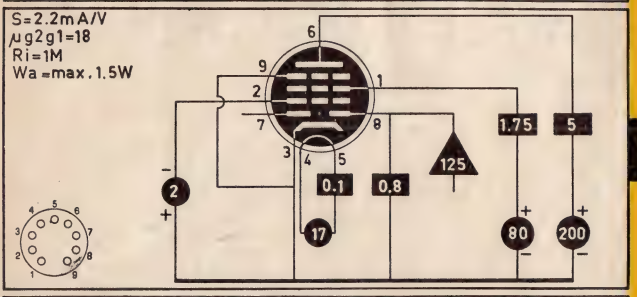

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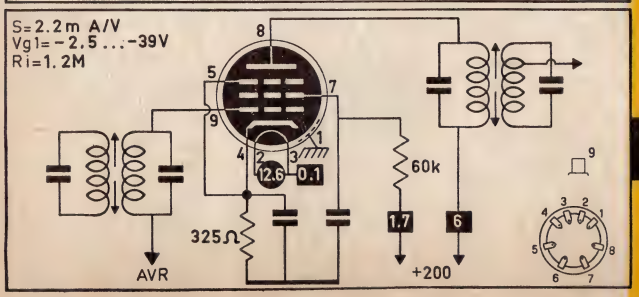

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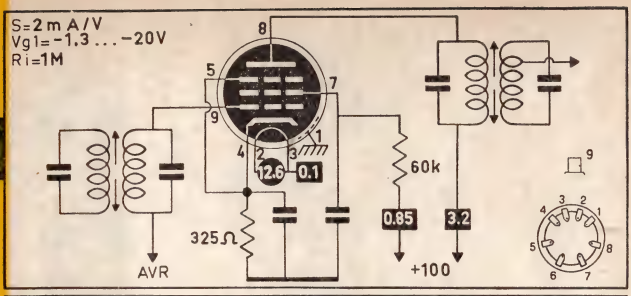

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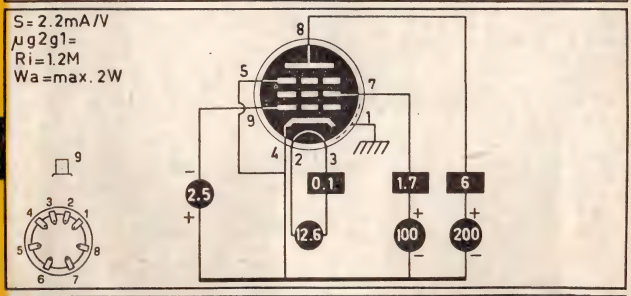

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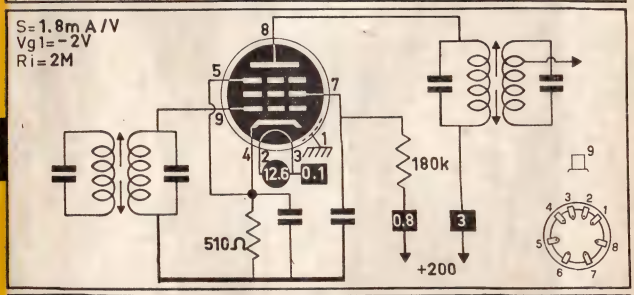

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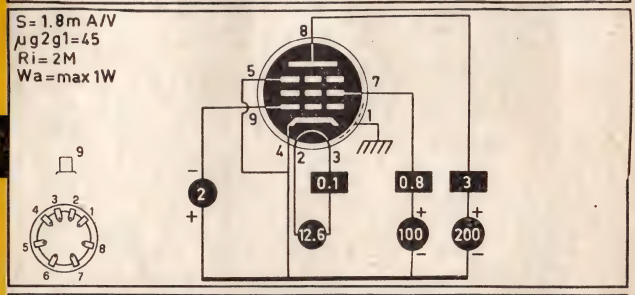

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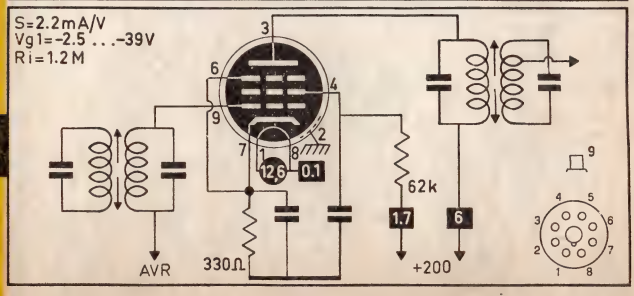

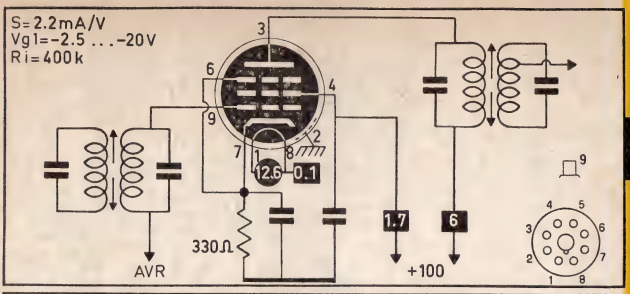

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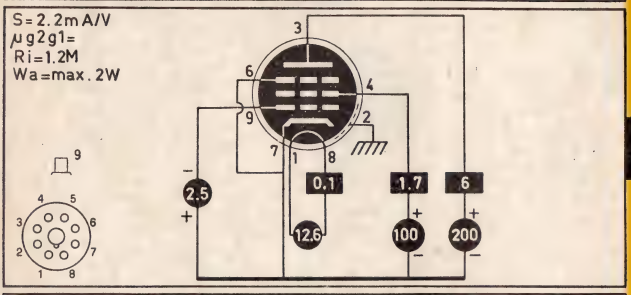

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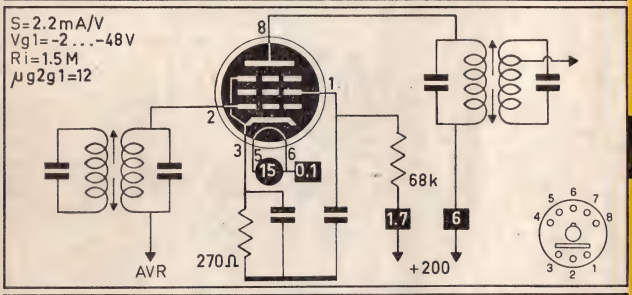

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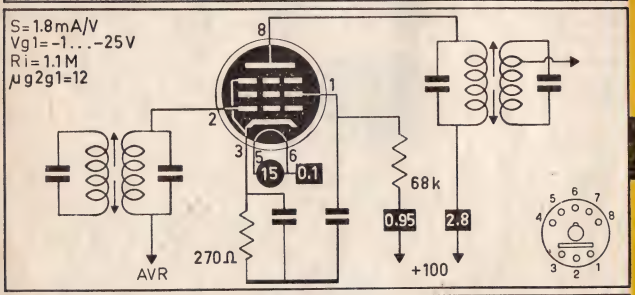

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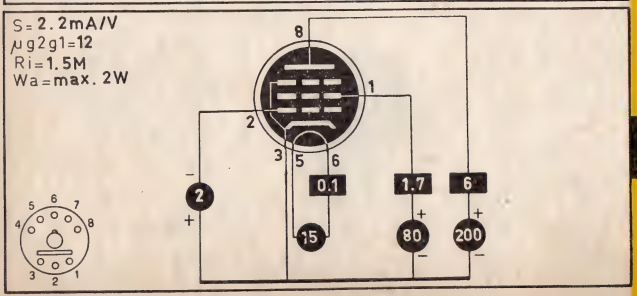

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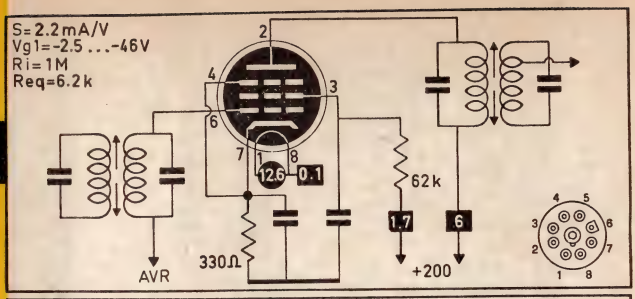

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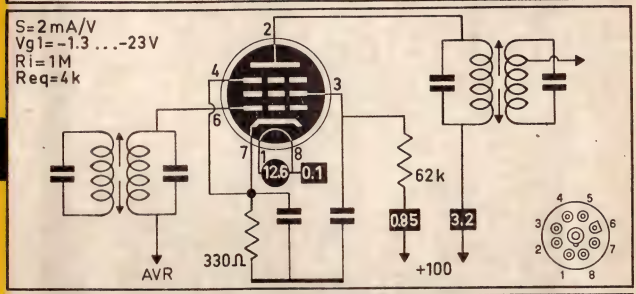

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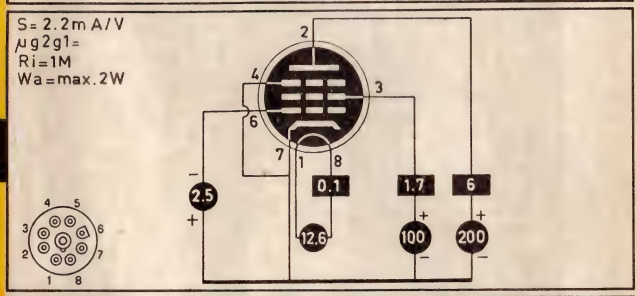

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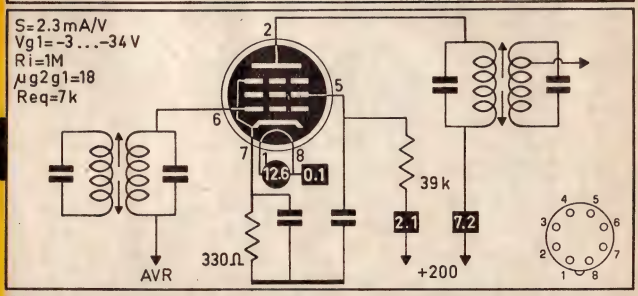

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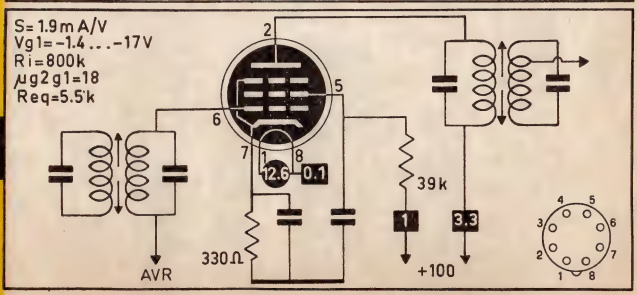

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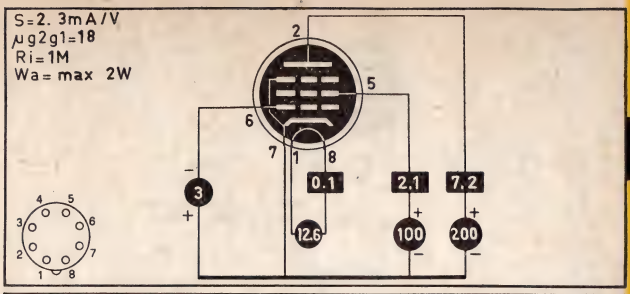

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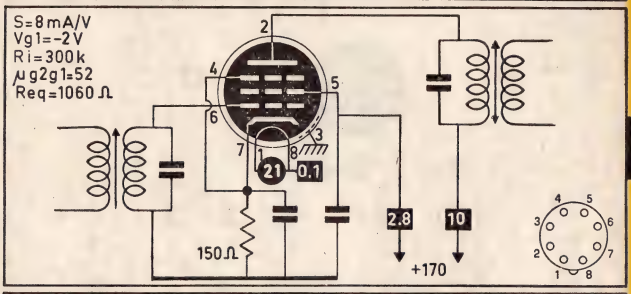

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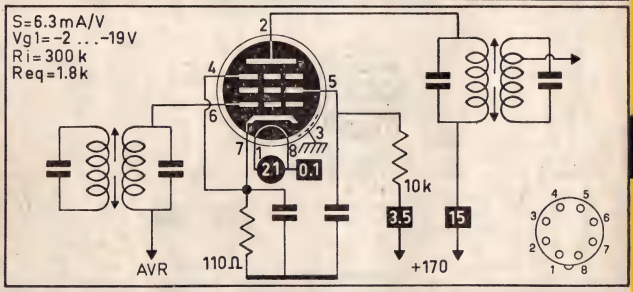

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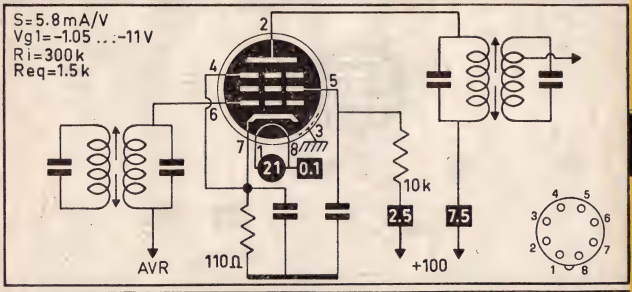

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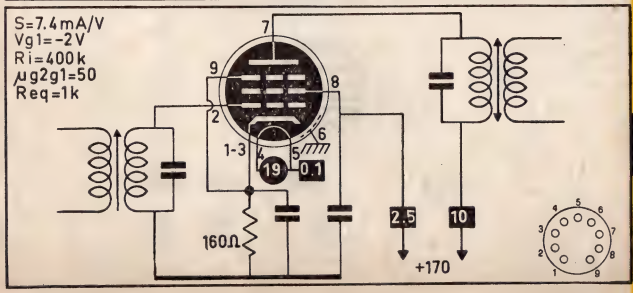

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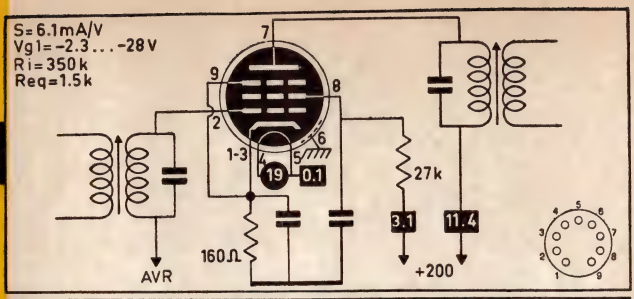

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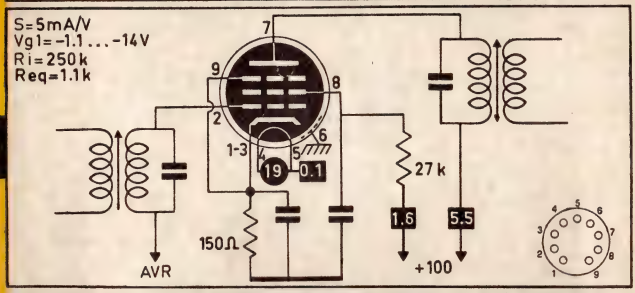

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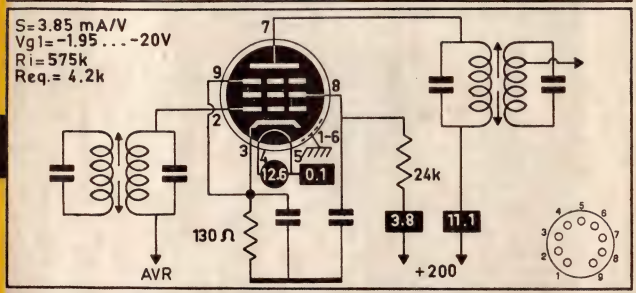

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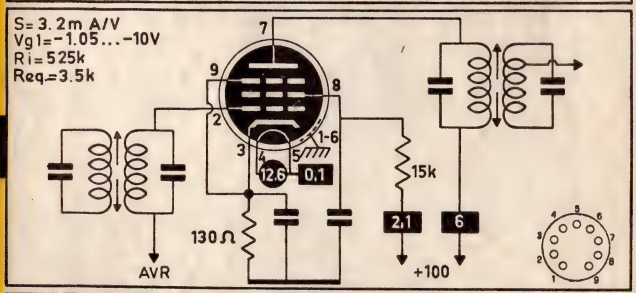

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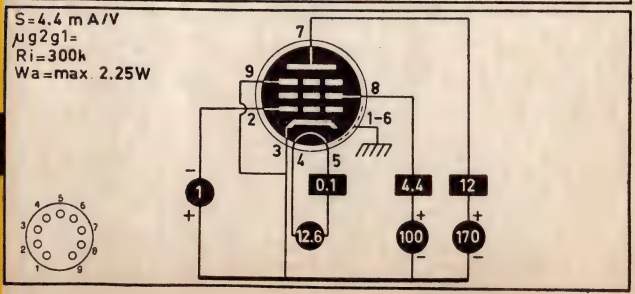

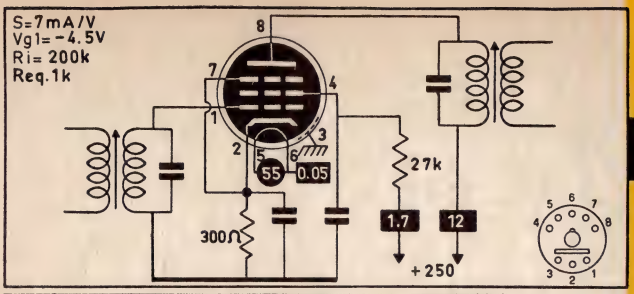
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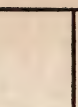
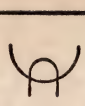
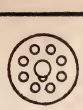
Vg1=-4.5V
Ri=200k
Req.1k
8
7
4
1
2
3
5
6
55
0.05
27k
300Ω
1.7
12
+250
5
6
7
4
8
3
2
1

	=		
1AF4	1AJ4	-	-
1AF5	DAF96	-	-
1AJ4	DF96	-	-
1L4	DF92	-	-
1N5	DF33	-	-
1S5	DAF91	-	-
1T4	DF91	-	-
6AG5	EF96	-	-
6AK5	EF95	-	-
6AM6	EF91	-	-
6AU6	EF94	12AU6	-
6BA6	EF93	12BA6	-
6BD6	-	12BD6	-
6BX6	EF80	-	-
6BY7	EF85	-	-
6B7	-	-	6B8
6B8	-	12C8	6B7
6CQ6	EF92	-	-
6J7	-	12J7	-
6K7	-	12K7	-
6N8	EBF80	-	-
6SF7	-	12SF7	-
6SG7	-	12SG7	-
6SH7	-	12SH7	-
6SJ7	-	12SJ7	-
6SK7	-	12SK7	-
6W7	-	6J7	-
7A7	-	14A7	-
7C7	-	14C7	-
7E7	-	14E7	-
7H7	-	14H7	-
7R7	-	14R7	-

7W7	-	14W7	-
12AU6	-	6AU6	-
12BA6	-	6BA6	-
12BD6	-	6BD6	-
12C8	-	6B7	6B7
12J7	-	6J7	-
12K7	-	6K7	-
12SF7	-	6SF7	-
12SG7	-	6SG7	-
12SH7	-	6SH7	-
12SJ7	-	6SJ7	-
12SK7	-	6SK7	-
14A7	-	7A7	-
14C7	-	7C7	-
14E7	-	7E7	-
14H7	-	7H7	-
14R7	-	7R7	-
14W7	-	7W7	-
AF3	-	CF3	-
AF7	-	CF7	-
CF3	-	AF3	-
CF7	-	AF7	-
DAF91	1S5	-	-
DAF96	1AF5	-	-
DF33	1N5	-	-
DF91	1T4	-	-
DF92	1L4	-	-
DF96	1AF4	-	-
EBF2	-	-	EBF32
EBF32	-	-	EBF2
EBF80	6N8	-	-
EF6	-	-	EF36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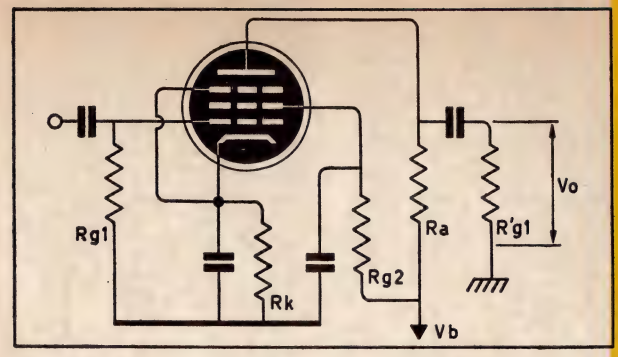
EF22	-	-	EF9
EF36	EF37	-	EF6
EF37	EF36	-	EF6
EF39	-	-	EF9
EF40	-	-	EF86
EF80	6BX6	-	-
EF85	6BY7	-	-
EF86	-	-	EF40
EF91	6AM6	-	-
EF92	6CQ6	-	-
EF93	6BA6	12BA6	-
EF94	6AU6	12AU6	-
EF95	6AK5	-	-
EF96	6AG5	-	-
SP41	-	SP61	-
SP61	-	SP41	-
UF5	-	-	UF9
UF9	-	-	UF5



1LC5 1S5 1U5

		Vb: 90V					
Ra	k	470			1000		
Rg2	M	1,8			3,9		
R'g1	M	1	4,7	10	2,2	4,7	10
Rk	k	–	–	–	–	–	–
Ia	mA	0,13	0,13	0,13	0,07	0,07	0,07
Ig2	mA	0,04	0,04	0,04	0,02	0,02	0,02
Vo max	Veff	16,5	20,3	21	15,1	17,4	17,6
A	—	59	72,5	75	84	96,8	104
d	%	4,6	4,5	4,8	4,7	4,9	4,8
		Rg1: 1OM					

1LD5

		Vb: 90V					
Ra	k	470			1000		
Rg2	M	2,7			5,6		
R'g1	M	1	4,7	10	2,2	4,7	10
Rk	k	–	–	–	–	–	–
Ia	mA	0,11	0,11	0,1,1	0,06	0,06	0,06
Ig2	mA	0,02	0,02	0,02	0,01	0,01	0,01
Vo max	Veff	11,9	16,9	17,5	12,4	16,3	18,2
A	—	62,7	77	79,6	82,8	96	101
d	%	4,7	4,8	4,7	4,9	4,8	5
		Rg1: 1OM					

1LN5 1N5

		Vb: 90V					
Ra	k	470			1000		
Rg2	M	2,2			4,7		
R'g1	M	1	4,7	10	2,2	4,7	10
Rk	k	–	–	–	–	–	–
Ia	mA	0,11	0,11	0,11	0,06	0,06	0,06
Ig2	mA	0,03	0,03	0,03	0,01	0,01	0,01
Vo max	Veff	12,5	17,2	17,9	12,9	16,1	17
A	—	73,5	90,5	94,2	99	115	121
d	%	4,9	4,7	4,6	4,9	4,9	4,9
		Rg1: 1OM					

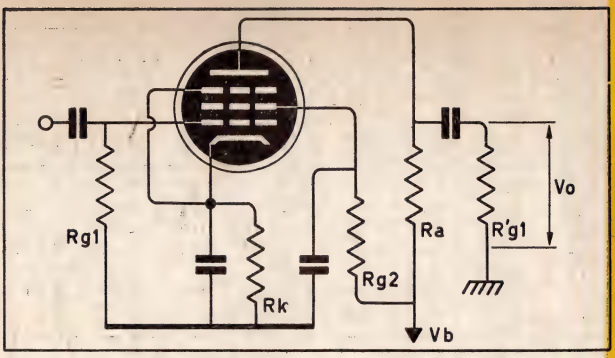
6SJ7
12SJ7

		Vb: 100V					
Ra	k	100		270		470	
Rg2	M	0,39		1,2		1,8	
R'g1	k	270	470	270	470	470	1000
Rk	k	1,2	1,2	2,7	2,7	4,7	4,7
Ia	mA	0,65	0,65	0,26	0,26	0,17	0,17
Ig2	mA	0,18	0,18	0,07	0,07	0,05	0,05
Vo max	Veff	13,2	14,9	11,1	13,9	12,8	16,6
A	—	65,8	74,5	79,4	99,5	98,5	128
d	%	3	2,9	5,1	4,3	4,6	5

		Vb: 250V					
Ra	k	100		270		470	
Rg2	M	0,39		1,2		2,2	
R'g1	k	270	470	270	470	470	1000
Rk	k	0,56	0,56	1,2	1,2	1,8	1,8
Ia	mA	1,77	1,77	0,68	0,68	0,4	0,4
Ig2	mA	0,5	0,5	0,18	0,18	0,1	0,1
Vo max	Veff	47	54	33	41,8	28	37
A	—	94	108	132	168	187	247
d	%	4,2	5	5,2	4,4	4,5	3,7
		Rg1: 270k					

6J7
6W7
7AJ7
7C7
12J7
14C7

		Vb: 100V					
Ra	k	100		270		470	
Rg2	M	0,47		1,2		1,8	
R'g1	k	270	470	270	470	470	1000
Rk	k	1	1	2,2	2,2	3,9	3,9
Ia	mA	0,62	0,62	0,27	0,27	0,17	0,17
Ig2	mA	0,15	0,15	0,06	0,06	0,47	0,47
Vo max	Veff	12,3	13,9	10,8	13,8	13,2	17
A	—	68,5	77,2	77,2	98,7	94,5	122
d	%	4,7	4,1	5,5	4,6	4,9	5
		Vb: 250V					
Ra	k	100		270		470	
Rg2	M	0,47		1,2		2,2	
R'g1	k	270	470	270	470	470	1000
Rk	k	0,47	0,47	1	1	1,5	1,5
Ia	mA	1,76	1,76	0,75	0,75	0,44	0,44
Ig2	mA	0,41	0,41	0,18	0,18	0,1	0,1
Vo max	Veff	40,3	45,2	33	41,6	32	41,5
A	—	101	113	122	154	178	230
d	%	4,3	4,4	5	5	4,3	4,9
		Rg1: 270k					



		Vb: 90V					
Ra	k	470			1000		
Rg2	M		1,5		3,3		
R'g1	M	1	4,7	10	2,2	4,7	10
Rk	k	–	–	–	–	–	–
Ia	mA	0,11	0,11	0,11	0,06	0,06	0,06
Ig2	mA	0,04	0,04	0,04	0,02	0,02	0,02
Vo max	Veff	10,4	15	16,5	10	11,8	15,1
A	—	80	100	103	111	131	138
d	%	4,8	4,9	4,5	4,9	4,4	4,6
		Rg1: 10M					

		Vb: 100V					
Ra	k	100		270		470	
Rg2	M	0,39		1		1,8	
R'g1	k	270	470	270	470	470	1000
Rk	k	1,2	1,2	2,7	2,7	4,7	4,7
Ia	mA	0,61	0,61	0,27	0,27	0,16	0,16
Ig2	mA	0,17	0,17	0,08	0,08	0,04	0,04
Vo max	Veff	8,55	9,8	8	10,2	9,6	12,5
A	—	77,8	89	80	102	96	129
d	%	5,1	4,6	5	3,8	5,2	3,9
		Vb: 250V					
Ra	k	100		270		470	
Rg2	M	0,39		1		1,8	
R'g1	k	270	470	270	470	470	1000
Rk	k	0,47	0,47	1	1	1,8	1,8
Ia.	mA	1,75	1,75	0,75	0,75	0,44	0,44
Ig2	mA	0,49	0,49	0,21	0,21	0,12	0,12
Vo max	Veff	29	33	22,5	28	26,4	34,5
A	—	132	150	150	187	189	247
d	%	4,8	4,3	4,5	3,8	4,7	4,4
		Rg1: 270k					

CF50

		Vb: 100V			Vb: 250V		
Ra	k	100	220	330	100	220	330
Rg2	k	270	330	390	680	680	820
R'g1	M	1	1	1	1	1	1
Rk	k	4,7	4,7	6,8	1,8	1,8	2,2
Ia	mA	0,3	0,3	0,2	0,9	0,9	0,7
Ig2	mA	0,09	0,09	0,07	0,22	0,22	0,18
Vo	Veff	3	3	3	3	3	3
A	—	140	145	150	280	295	315
d	%	1	1	1	1	1	1
		Rg1: 470k					

DAF41

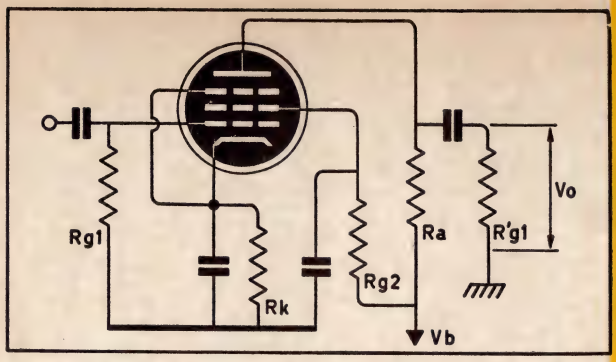
		Vb: 67,5V	Vb: 90V		Vb: 120V
Ra	k	220	220	470	470
Rg2	M	0,82	0,82	2,2	2,2
R'g1	M	1	1	1	1
Rk	k	–	–	–	–
Ia	mA	0,17	0,25	0,13	0,18
Ig2	mA	0,04	0,06	0,03	0,04
Vo	Veff	5	5	5	5
A	—	60	70	83	100
d	%	1,7	0,9	1,4	1
		Rg1: 3M			

DAF91

		Vb: 45V		Vb: 67,5V		Vb: 90V	
Ra	k	470	1000	470	1000	470	1000
Rg2	M	1,8	3,9	1,8	3,9	1,8	3,9
R'g1	M	1	1	1	1	1	1
Rk	k	–	–	–	–	–	–
Ik	mA	0,07	0,04	0,13	0,06	0,17	0,09
Vo	Veff	5	5	5	5	5	5
A	—	38	42	50	55	56	60
d	%	4	5	1	3	1	2
		Rg1: 10M					

DAF96

		Vb: 67,5V •		Vb: 90V		
Ra	M	1		1		1
Rg2	M	2,2		2,7		–
R'g1	M	1	2,2	1	2,2	2,2
Rk	k	–	–	–	–	–
Ia	mA	0,04	0,04	0,06	0,06	0,06
Ig2	mA	0,01	0,01	0,02	0,02	–
Vo	Veff	5	5	5	5	5
A	—	50	63	55	70	13,5
d	%	3,5	1,8	1,4	2,4	1,2
		Rg1: 10M				



DF21

		Vb: 90V		Vb: 120V	
Ra	k	220	470	220	470
Rg2	M	1	2,2	1	2,2
R'g1	k	1	1	1	1
Rk	k	–	–	–	–
Ia	mA	0,17	0,1	0,28	0,15
Ig2	mA	0,03	0,02	0,06	0,03
Vo	Veff	3	3	3	3
A	—	53	69	68	85
d	%	1,6	1,2	0,75	0,8
		Rg1: 1,5M			

EAF42

		Vb: 250V			
Ra	k	100	220	47	100
Rg2	k	390	820	–	–
R'g1	k	680	680	680	680
Rk	k	0,68	1,5	0,39	0,68
Ia	mA	1,52	0,8	3,8	2
Ig2	mA	0,53	0,26	–	–
Vo	Veff	8	8	8	8
A	—	100	120	14	15
d	%	1	1,2	1,1	1,2

EBF11

		Vb: 250V	
Ra	k	100	220
Rg2	k	390	820
R'g1	k	680	680
Rk	k	1	2,2
Ia	mA	1,5	0,8
Ig2	mA	0,46	0,24
Vo	Veff	5	5
A	—	83	98
d	%	1,15	1,3
		Rg1: 1M	

EBF80

		Vb: 250V		Vb: 250V	
Ra	k	100	220	47	100
Rg2	k	390	820	–	–
R'g1	k	330	680	150	330
Rk	k	1	1,8	0,56	0,82
Ia	mA	1,5	0,75	4,1	2,08
Ig2	mA	0,53	0,3	–	–
Vo	Veff	8	8	8	8
A	—	80	110	13	14
d	%	2,2	2	2,9	4,3
		Rg1: 1M			

EF6 EF36

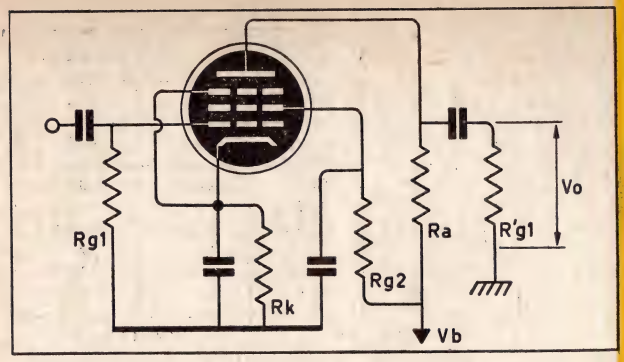
		Vb: 100V			Vb: 250V		
Ra	k	100	220	330	100	220	330
Rg2	k	220	390	560	270	390	820
R'g1	k	680	680	680	680	680	680
Rk	k	3,3	4,7	6,8	1,5	3,3	3,9
Ia	mA	0,6	0,3	0,22	1,6	0,9	0,6
Ig2	mA	0,2	0,12	0,08	0,5	0,35	0,2
Vo	Veff	2,4	2,4	2,4	3,7	3,7	3,7
A	—	85	100	105	110	140	165
d	%	1	0,9	1	1	1	1
		Rg1: 1,5M					

EF9 EF22 EF39

		Vb: 250V	
Ra	k	100	220
Rg2	k	390	820
R'g1	k	680	680
Rk	k	1	1,8
Ia	mA	1,6	0,87
Ig2	mA	0,45	0,26
Vo	Veff	10	10
A	—	85	106
d	%	2,5	2,7
		Rg1: 1M	

EF11

		Vb: 100V	Vb: 200V	Vb: 250V
Ra	k	220	220	220
Rg2	k	680	680	680
R'g1	k	680	680	680
Rk	k	2,2	2,2	1,5
Ia	mA	0,37	0,76	1
Ig2	mA	0,12	0,26	0,35
Vo	Veff	5	5	5
A	—	66	77	98
d	%	4	1,7	1,4
		Rg1: 1M		



		Vb:100V			Vb:250V		
Ra	k	47	100	220	47	100	220
Rg2	k	150	270	470	220	270	470
R'g1	k	680	680	680	680	680	680
Rk	k	0,82	1,2	2,2	0,68	0,82	1,5
Ia	mA	0,92	0,6	0,32	2,15	1,7	0,9
Ig2	mA	0,48	0,25	0,14	0,82	0,68	0,37
Vo	Veff	5	5	5	5	5	5
A	—	70	100	128	90	137	181
d	%	0,7	0,4	0,7	0,45	0,15	0,2
		Rg1:1M					

		Vb:250V			Vb:300V		
Ra	k	47	100	220	47	100	220
Rg2	k	-	-	-	-	-	-
R'g1	k	150	330	680	150	330	680
Rk	k	1,2	2,2	3,9	1,2	2,2	3,9
Ia	mA	2,3	1,25	0,65	2,7	1,5	0,8
Ig2	mA	-	-	-	-	-	-
Vo max	Veff	32	39	39	43	50	51
A	—	23,5	28	30,5	24	28,5	31
d	%	3,5	3,7	3,5	3,8	3,8	3,7
		Vb:350V			Vb:400V		
Ra	k	47	100	220	47	100	220
Rg2	k	-	-	-	-	-	-
R'g1	k	150	330	680	150	330	680
Rk	k	1,2	2,2	3,9	1,2	2,2	3,9
Ia	mA	3,2	1,7	0,9	3,7	2	1,05
Ig2	mA	-	-	-	-	-	-
Vo max	Veff	53	62	62	64	73	74
A	—	24,5	28,5	31,5	24,5	28,5	32
d	%	4	4	3,7	4,5	4	3,8
		Rg1:1M					

EF40 EF86

		Vb: 250V			Vb: 100V
Ra	k	100	220	220	220
Rg2	M	0,39	1	1,2	1,2
R'g1	k	330	680	680	680
Rk	k	1	2,2	–	–
Ik	mA	2,05	0,95	1,07	0,36
Vo	Veff	12	12	12	12
A	—	112	180	200	130
d	%	0,8	1,4	1	3
		Rg1: 1M		Rg1: 10M	

EF89

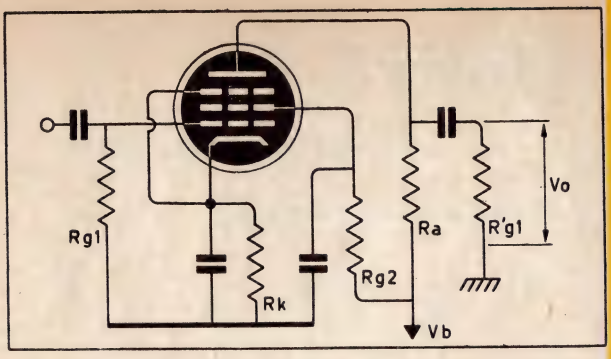
		Vb: 250V			
Ra	k	100	220	100	220
Rg2	k	270	680	470	1000
R'g1	M	1	1	1	1
Rk	k	0,56	1,2	–	–
Ia	mA	2,05	0,92	1,5	0,79
Ig2	mA	0,7	0,3	0,49	0,24
Vo	Veff	8	8	8	8
A	—	115	135	170	240
d	%	0,5	1,05	1,9	1,3
		Rg1: 1M		Rg1: 10M	

UAF42

		Vb: 100V			Vb: 170V		
Ra	k	100	220	100	100	220	100
Rg2	k	330	820	–	330	820	–
R'g1	k	680	680	680	680	680	680
Rk	k	1,5	2,7	1,8	1,5	2,7	1,8
Ia	mA	0,58	0,29	0,7	1,05	0,5	1,2
Ig2	mA	0,21	0,09	–	0,37	0,17	–
Vo	Veff	5	5	5	8	8	8
A	—	60	75	12	68	80	12
d	%	1	1,1	2,2	1,1	1,2	3,2
		Rg1: 1M					

UBF11

		Vb: 100V	Vb: 200V
Ra	k	220	220
Rg2	k	680	680
R'g1	k	680	680
Rk	k	2,2	2,2
Ia	mA	0,33	0,66
Ig2	mA	0,12	0,24
Vo	Veff	5	5
A	—	76	82
d	%	1,2	1,2
		Rg1: 1M	



UBF80

		Vb:100V		Vb:170V		Vb:170V	
Ra	k	100	220	100	220	47	100
Rg2	k	270	680	270	680	-	-
R'g1	k	330	680	330	680	150	330
Rk	k	1	2,7	1	2,7	1	1,8
Ia	mA	0,73	0,32	1,25	0,56	2,4	1,25
Ig2	mA	0,29	0,12	0,5	0,2	-	-
Vo	Veff	5	5	8	8	8	8
A	—	67	82	70	85	11	11
d	%	1,8	1,9	2	1,8	4,6	4,8
		Rg1:1M					

UF5 UF9 UF21

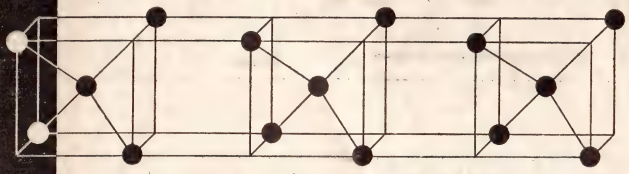
		Vb:100V	Vb:200V	
Ra	k	220	100	220
Rg2	k	820	390	820
R'g1	k	680	680	680
Rk	k	2,7	1,2	2,7
Ia	mA	0,33	1,22	0,65
Ig2	mA	0,08	0,35	0,17
Vo	Veff	3	8	8
A	—	82	78	88
d	%	0,85	2	2
		Rg1:1M		

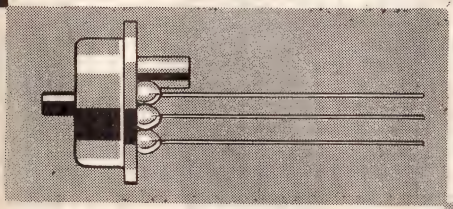
UF11

		Vb:100V	Vb:200V	
Ra	k	220	100	220
Rg2	k	560	390	560
R'g1	k	680	680	680
Rk	k	2,2	1,5	2,2
Ia	mA	0,37	1,18	0,76
Ig2	mA	0,12	0,37	0,26
Vo	Veff	5	5	5
A	—	66	69	77
d	%	4	1,5	1,7
		Rg1:1M		

PHILIPS

transistoren en germanium diodes





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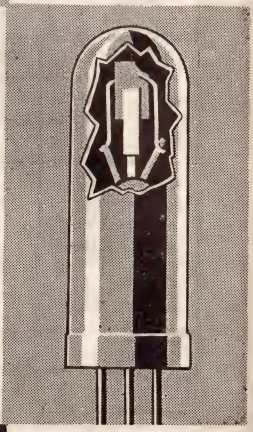

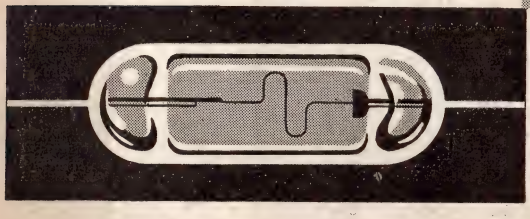

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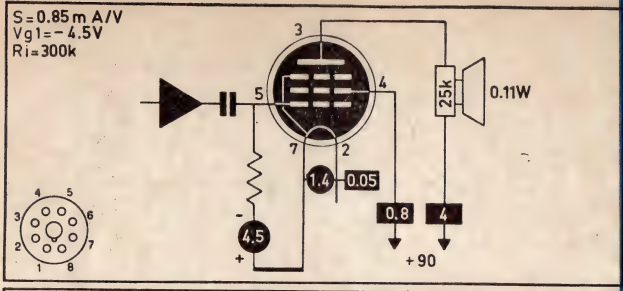
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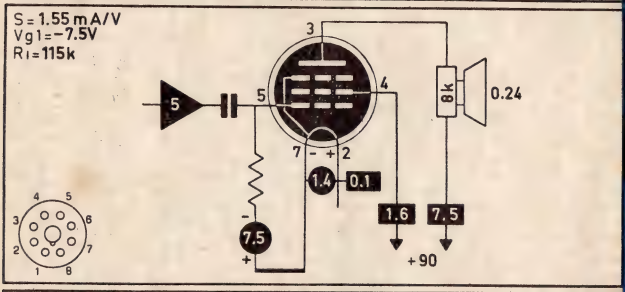
Vg1 = − 4.5V
Ri = 300k
3
5
4
7
2
25k
0.11W
1.4
0.05
0.8
4
4.5
+90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Vg1 = − 7.5V
Ri = 115k
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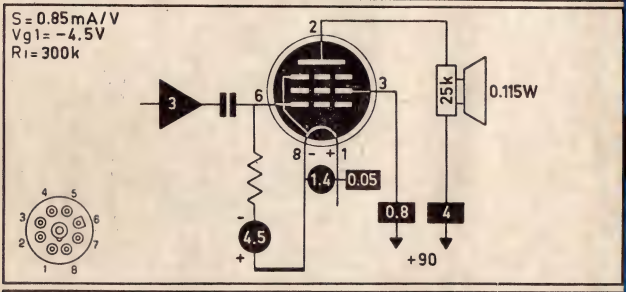
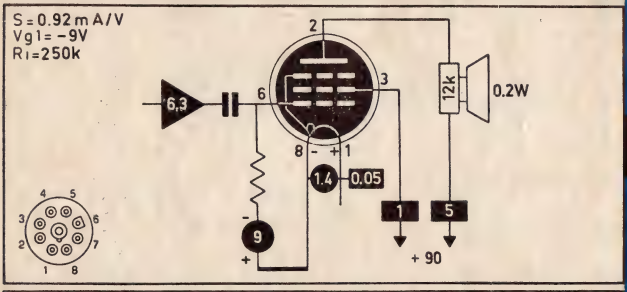
5
5
4
7
2
8k
0.24
1.4
0.1
1.6
7.5
7.5
+90


S = 0.85 mA/V
Vg1 = − 4.5V
Ri = 300k
2
3
6
3
8
1
25k
0.115W
1.4
0.05
0.8
4
4.5
+90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Vg1 = − 9V
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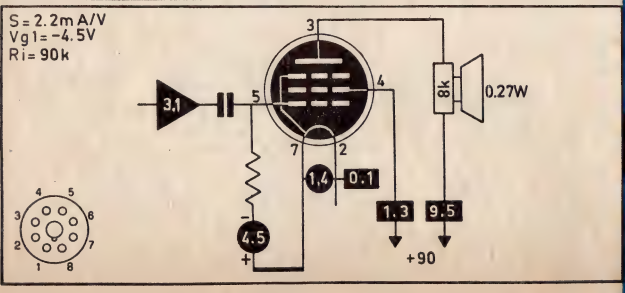
6,3
6
3
8
1
12k
0.2W
1.4
0.05
1
5
9
+ 90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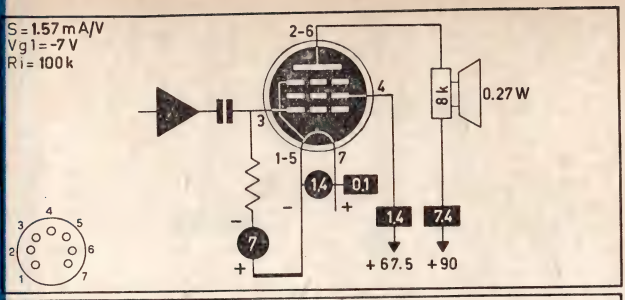
Vg1 = − 4.5V
Ri = 90k
3
3,1
5
4
7
2
8k
0.27W
1.4
0.1
1.3
9.5
4.5
+90

1S4



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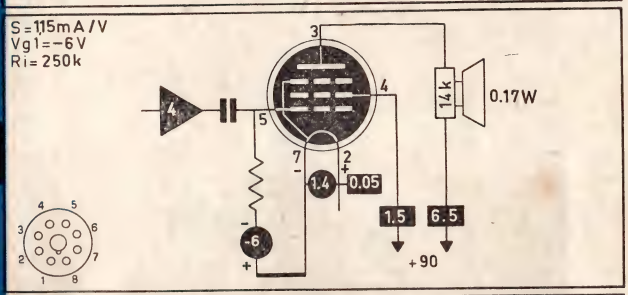

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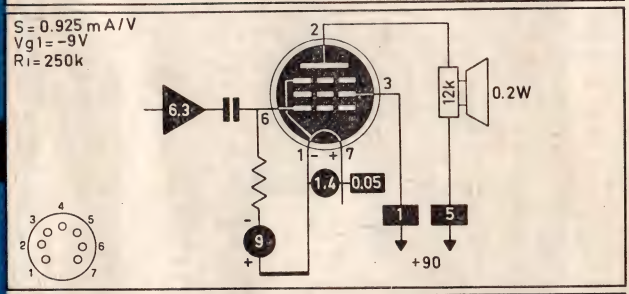

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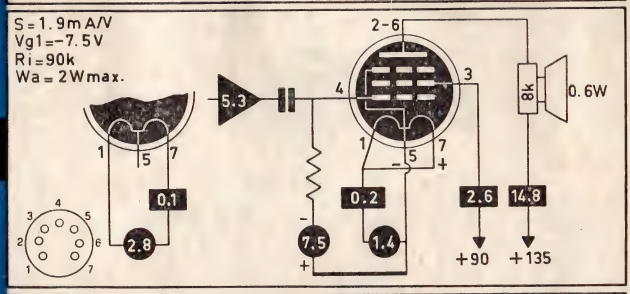
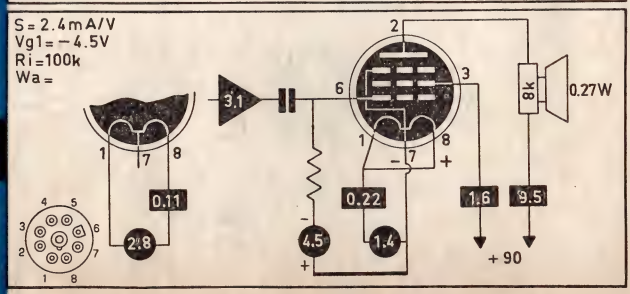
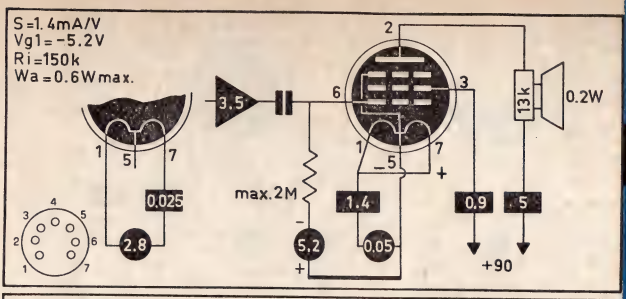


3D6





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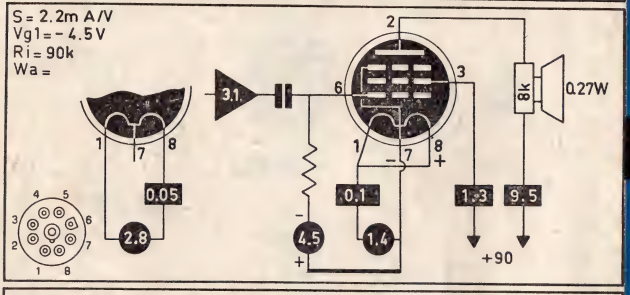

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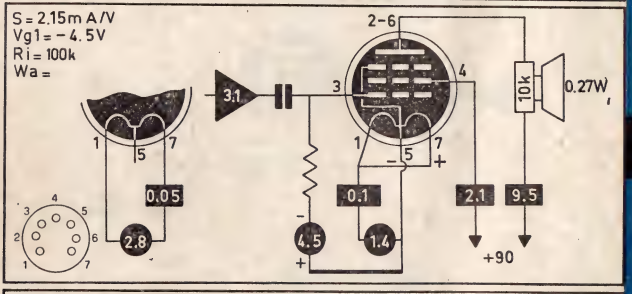

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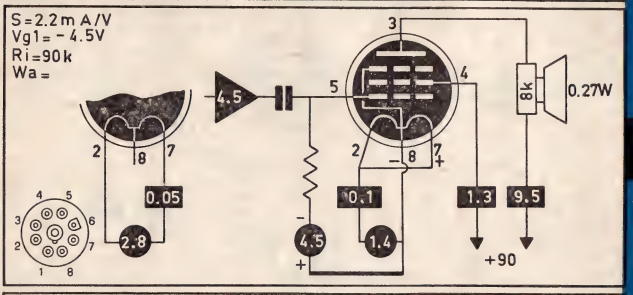

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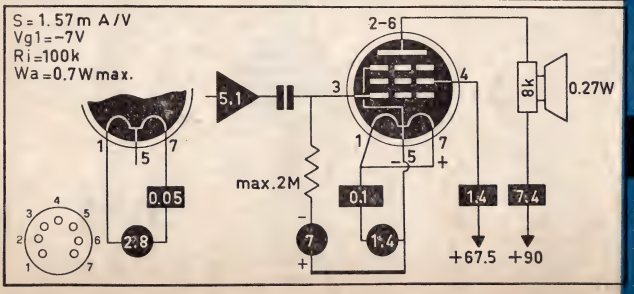

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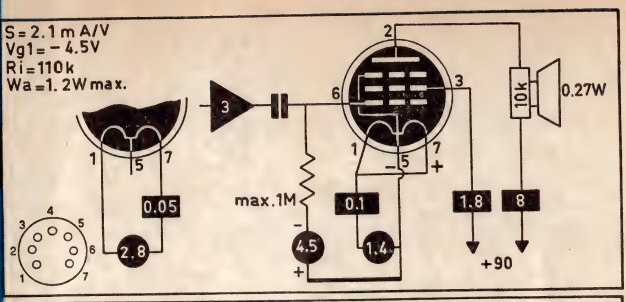
3V4



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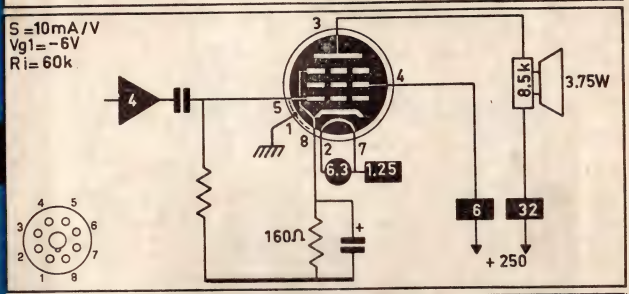

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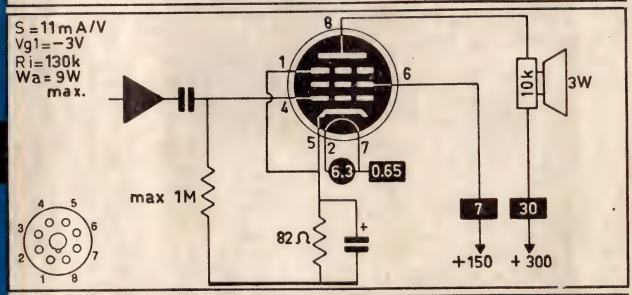

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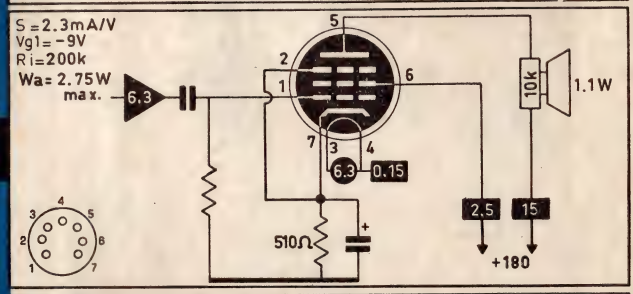

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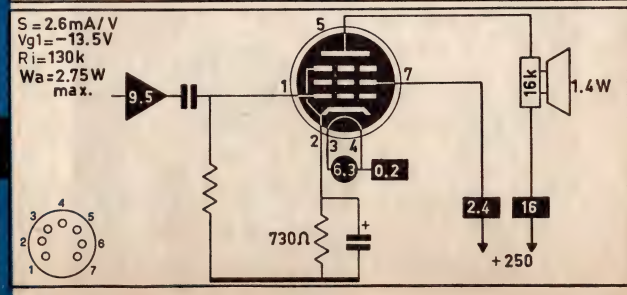
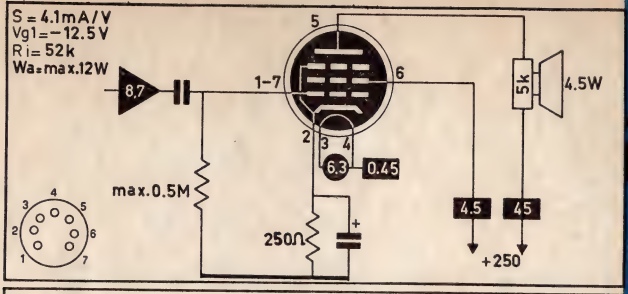
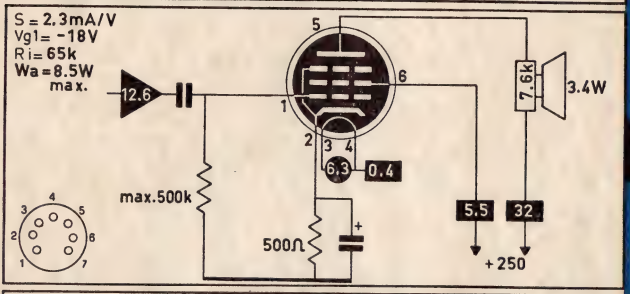


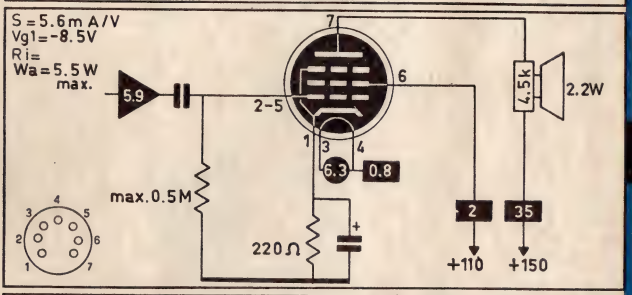
S = 4.1mA/V
Vg1=−12.5V
Ri=52k
Wa=max.12W



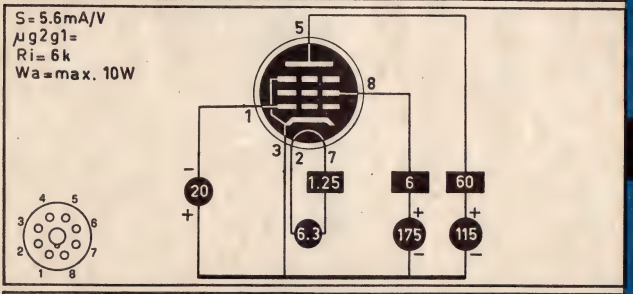
S = 2.3mA/V
Vg1= −18V
Ri=65k
Wa=8.5W
max.



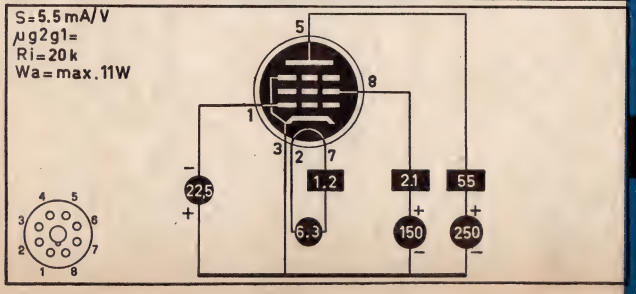
S = 5.6mA/V
Vg1=-8.5V
Ri=
Wa=5.5W
max.



S=5.6mA/V
μg2g1=
Ri=6k
Wa=max. 10W

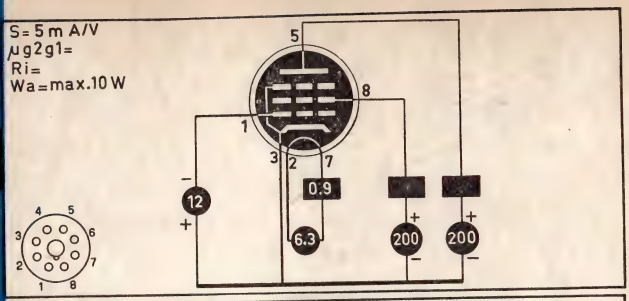


S=5.5mA/V
μg2g1=
Ri=20k
Wa=max.11W



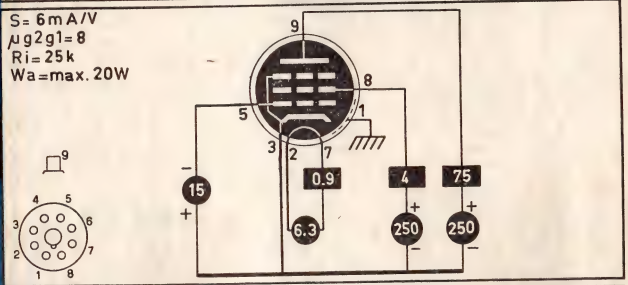
6BD5

S = 5 m A/V
μg2g1 =
Ri =
Wa = max. 10 W



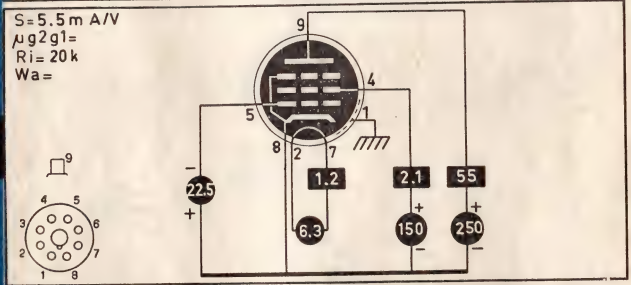
6BG6

S = 6 m A/V
μg2g1 = 8
Ri = 25 k
Wa = max. 20 W



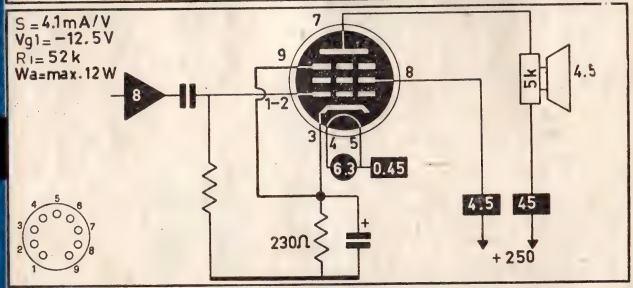
6BQ6

S = 5.5 m A/V
μg2g1 =
Ri = 20 k
Wa =



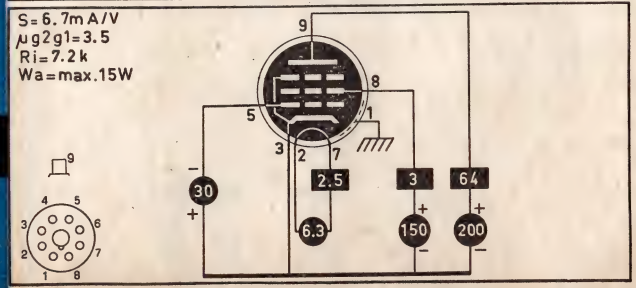
6BW6

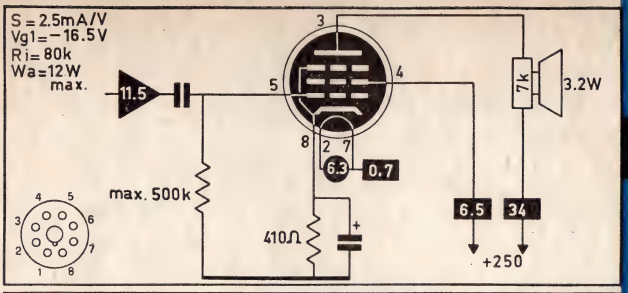
S = 4.1 mA/V
Vg1 = −12.5 V
Ri = 52 k
Wa = max. 12 W



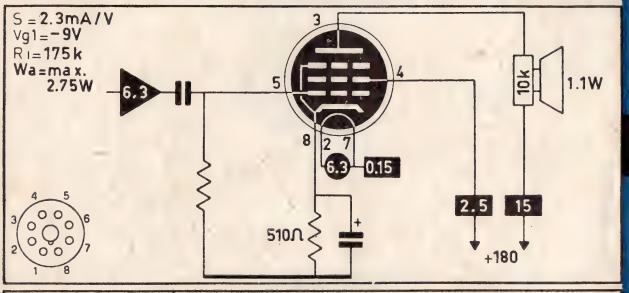
6CD6

S = 6.7 mA/V
μg2g1 = 3.5
Ri = 7.2 k
Wa = max. 15 W





6F6



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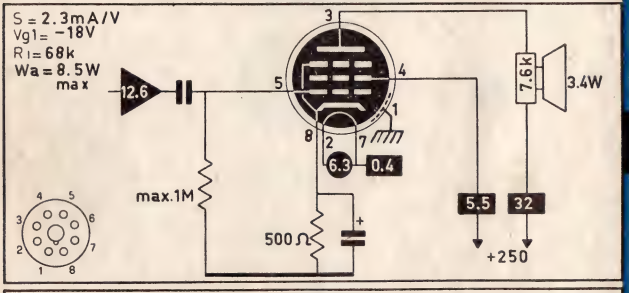

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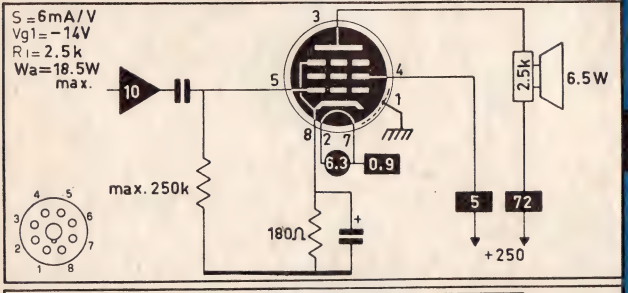

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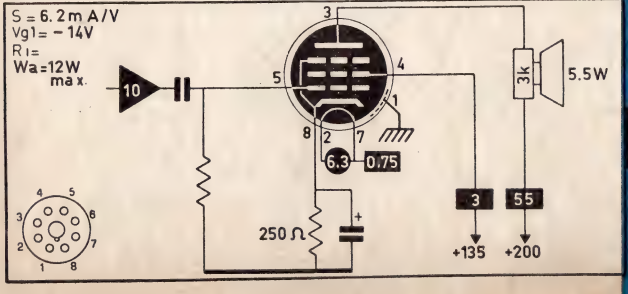

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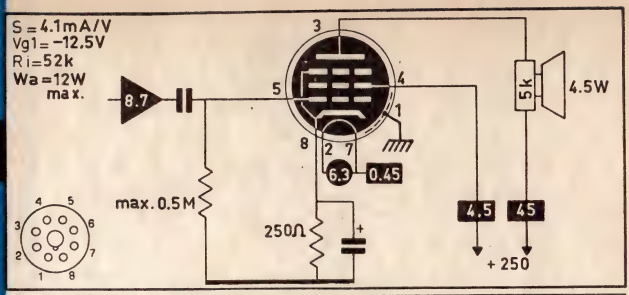
6V6



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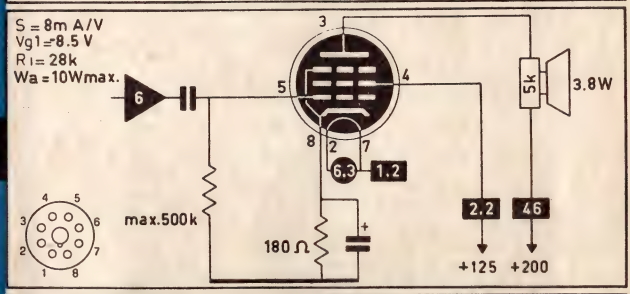

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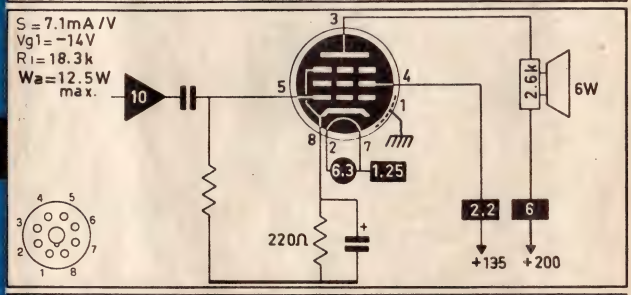

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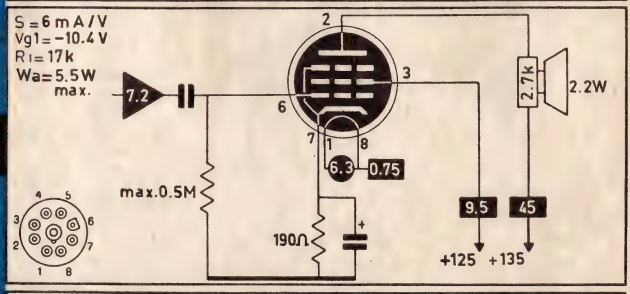

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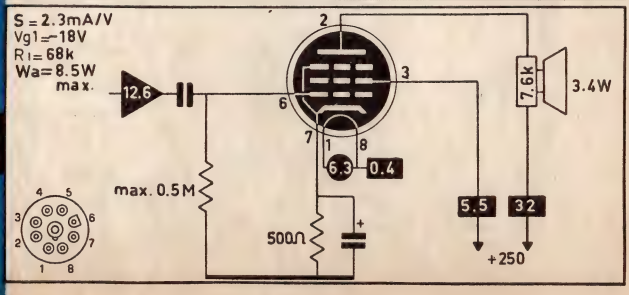

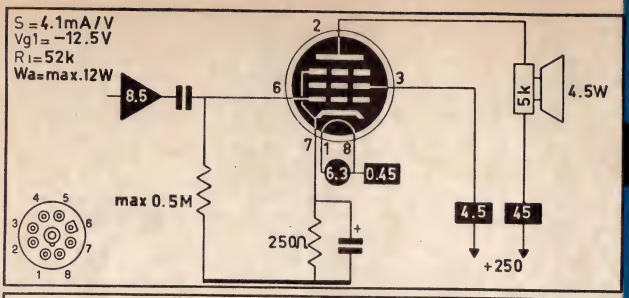

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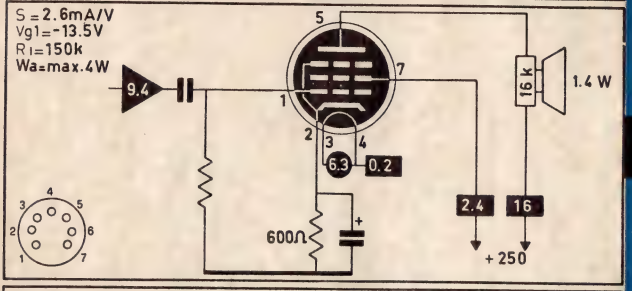

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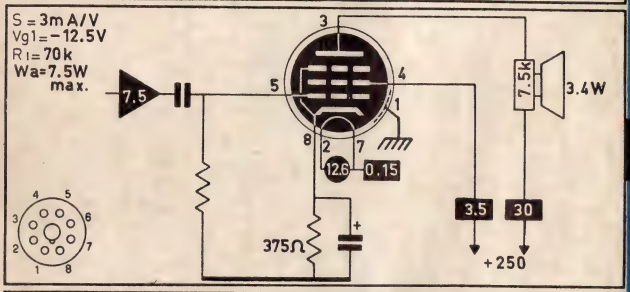

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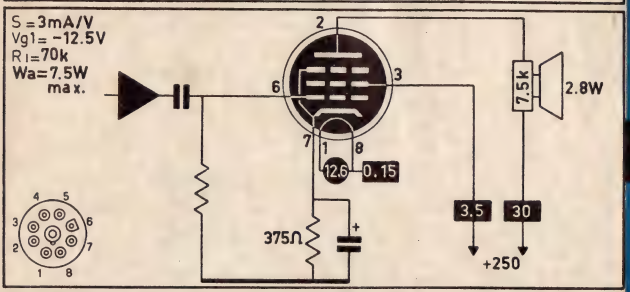

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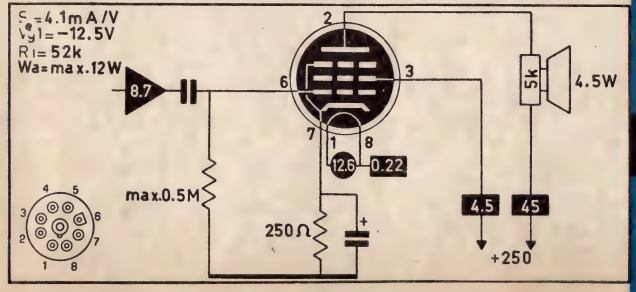

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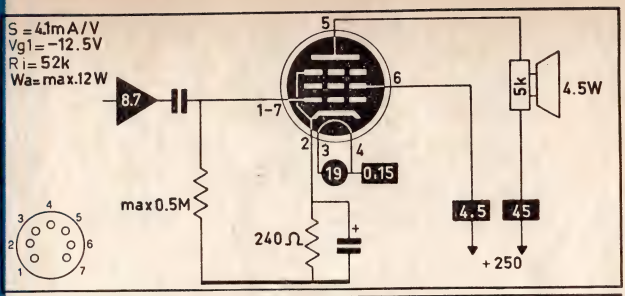

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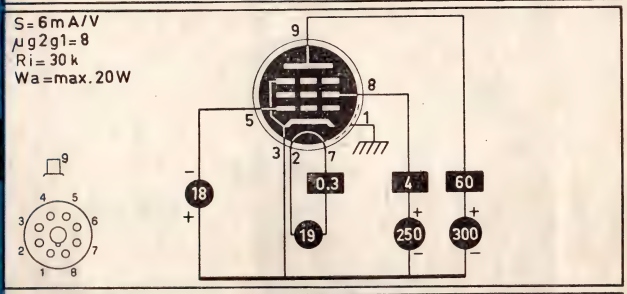

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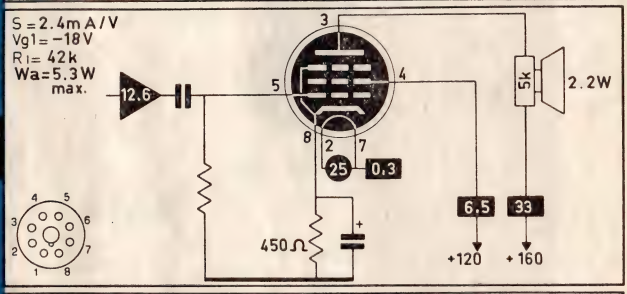

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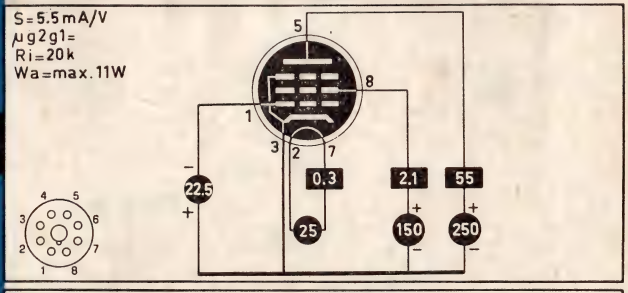

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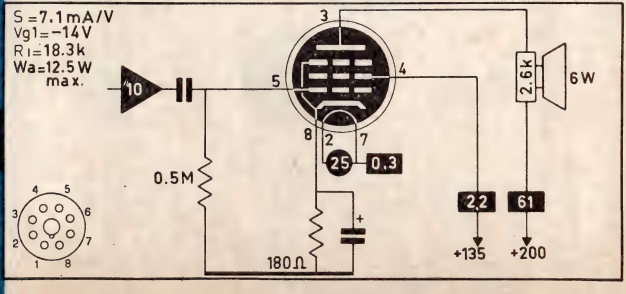

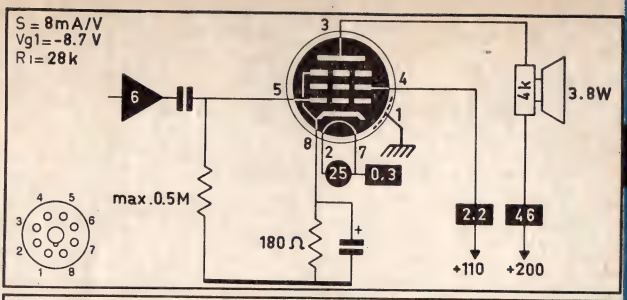

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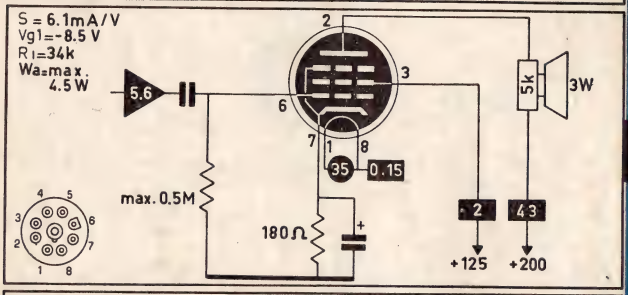

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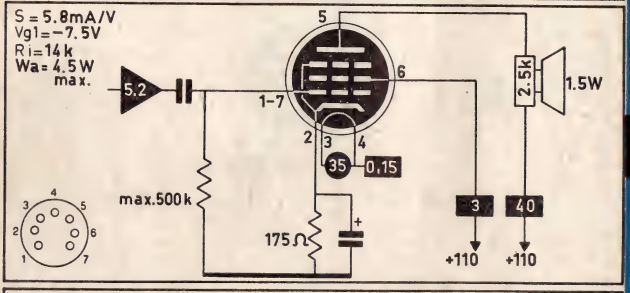

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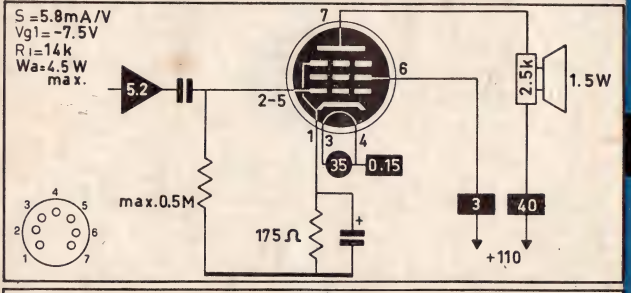

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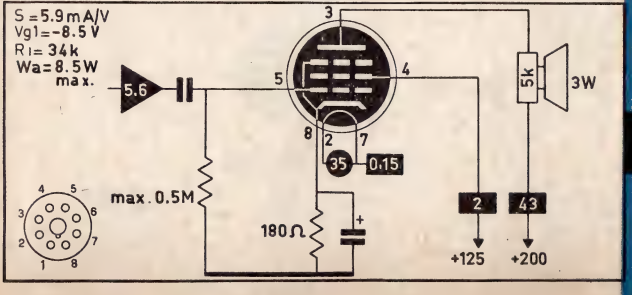

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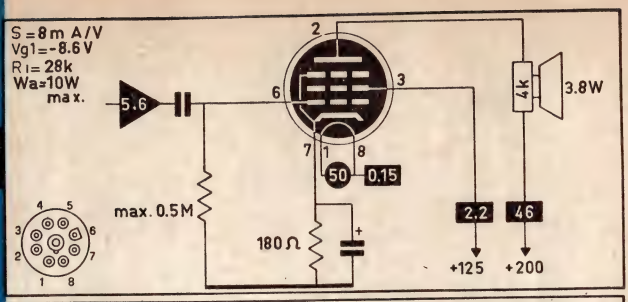

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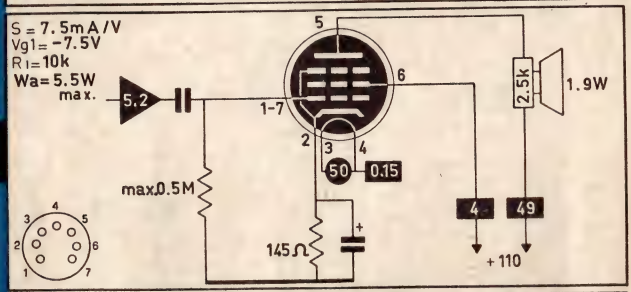

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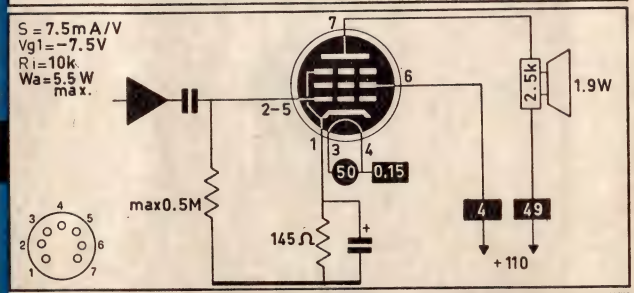

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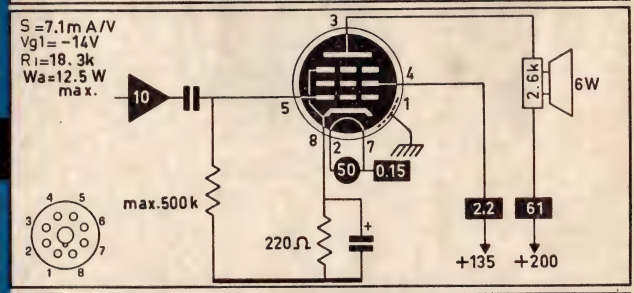

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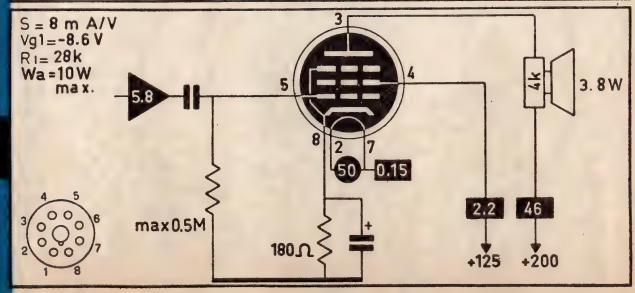

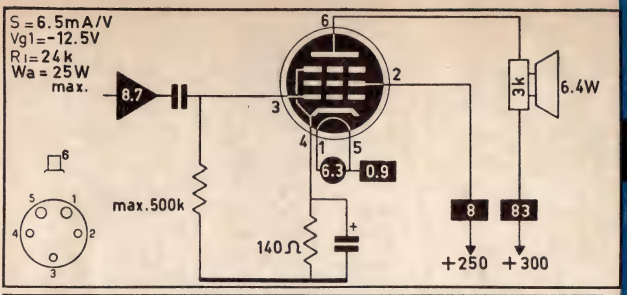

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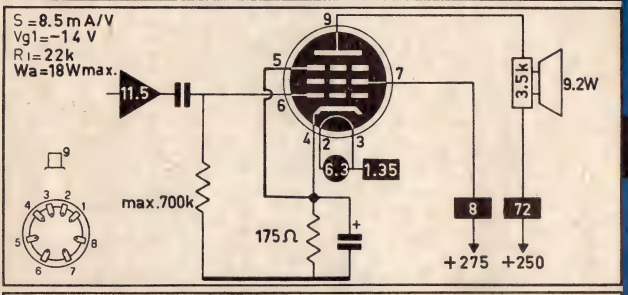
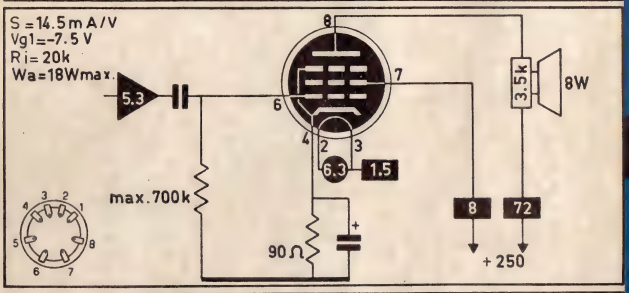


4654



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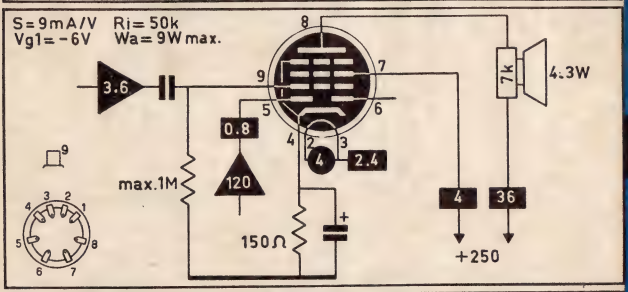
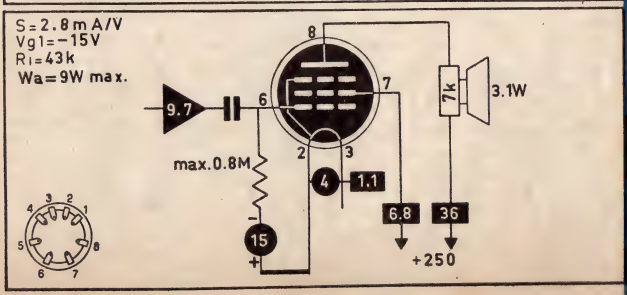
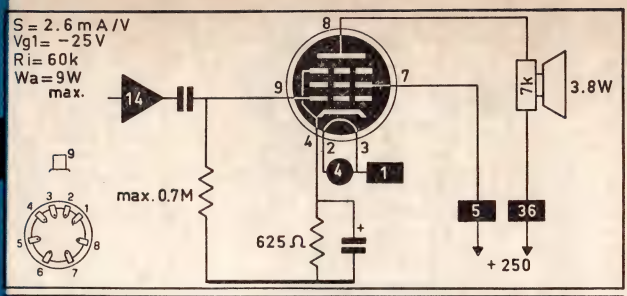


ABL1

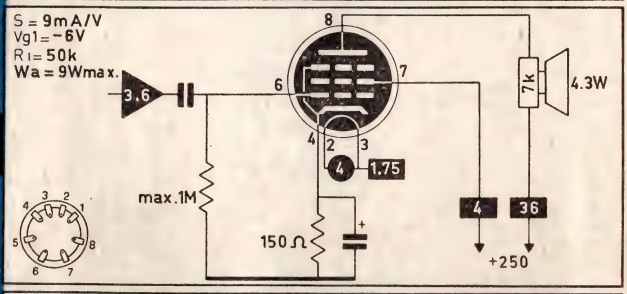


AL1

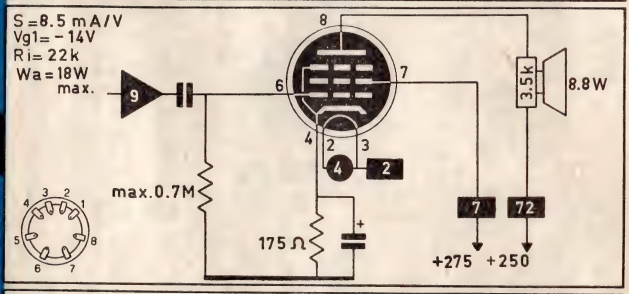
AL2



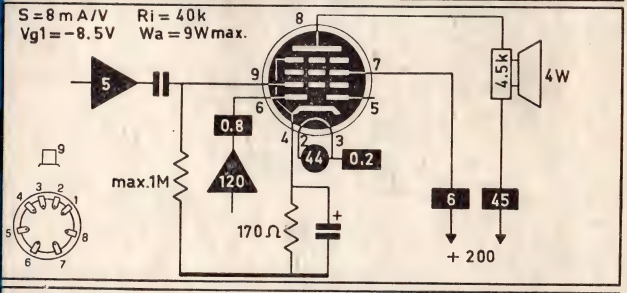
AL4



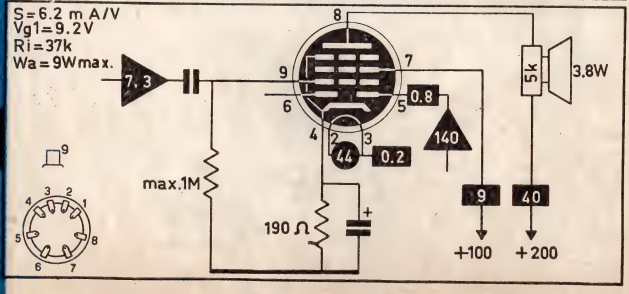
AL5

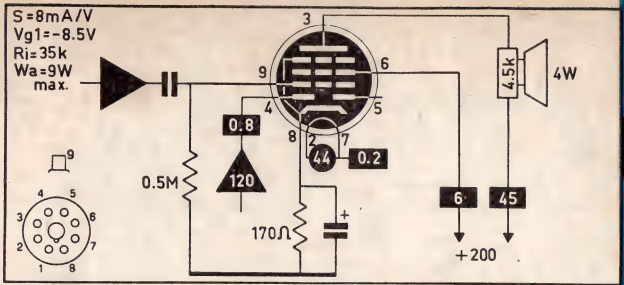


CBL1

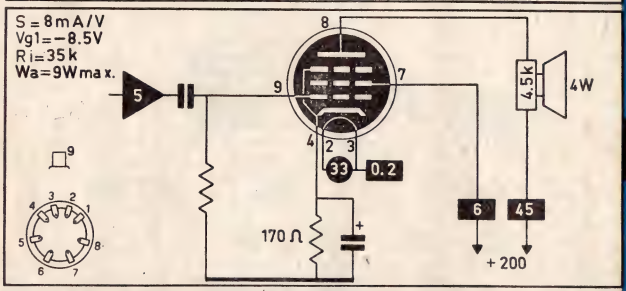


CBL6

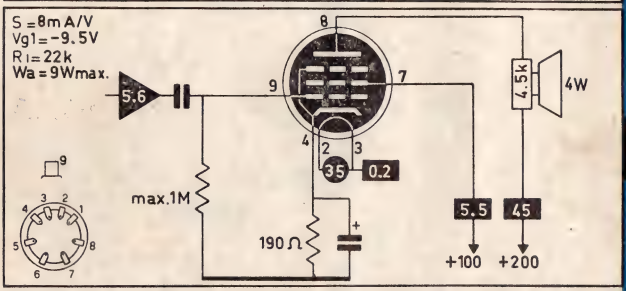




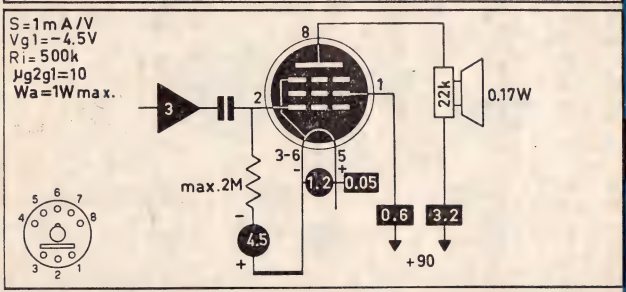
CBL31



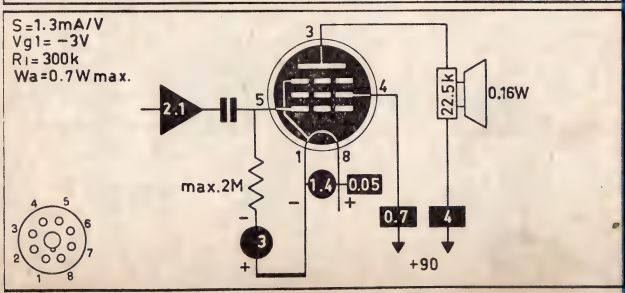
CL4



CL6

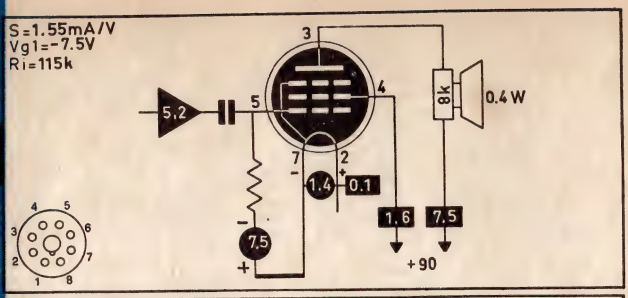


DL11



DL21

DL35



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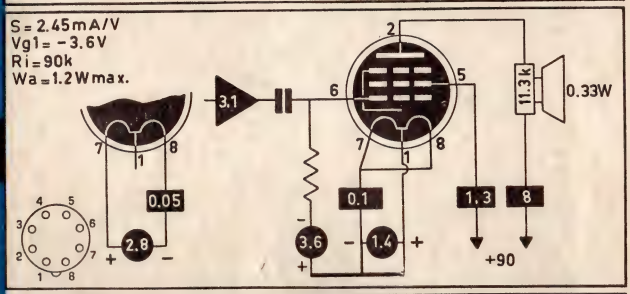
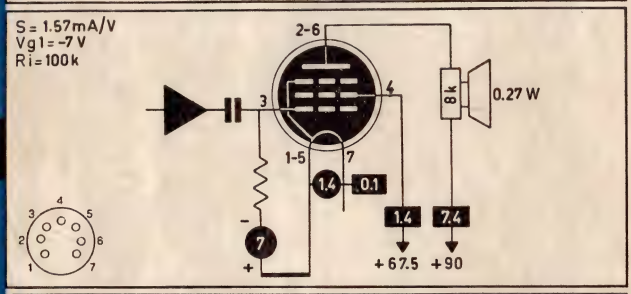
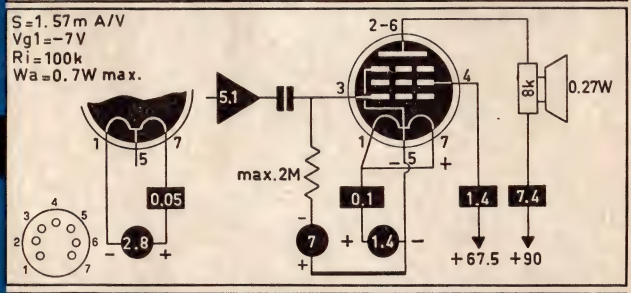


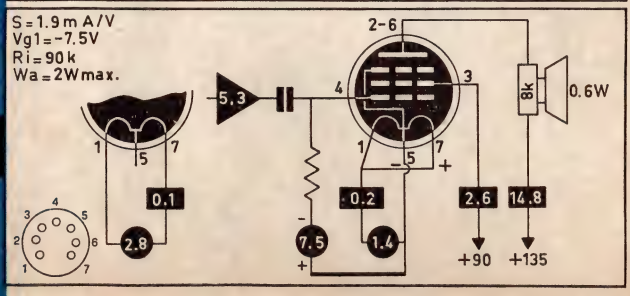
DL91

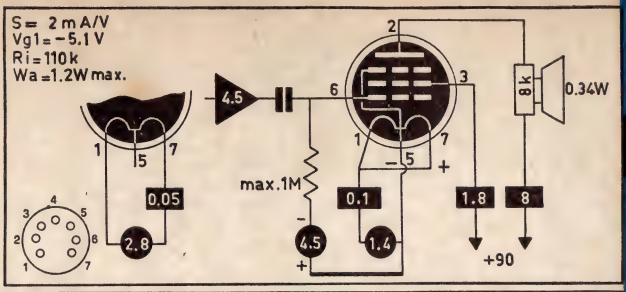


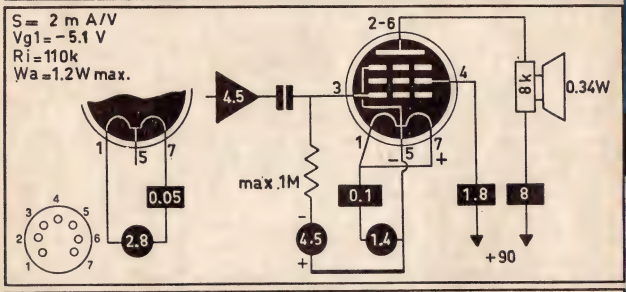
DL92

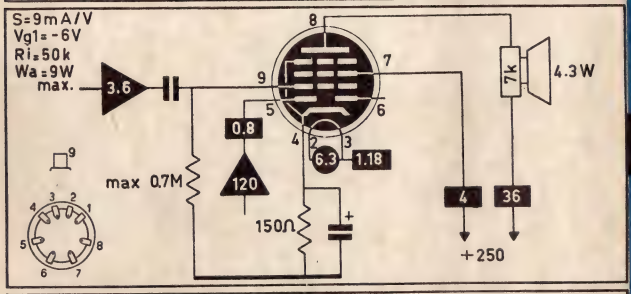


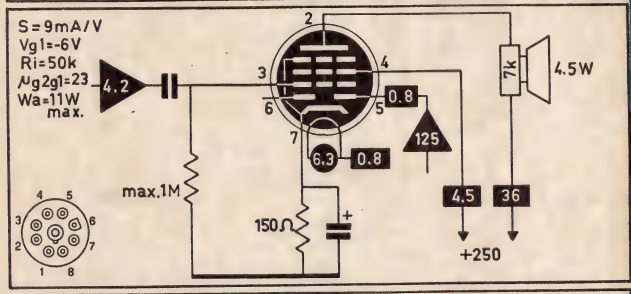
DL93

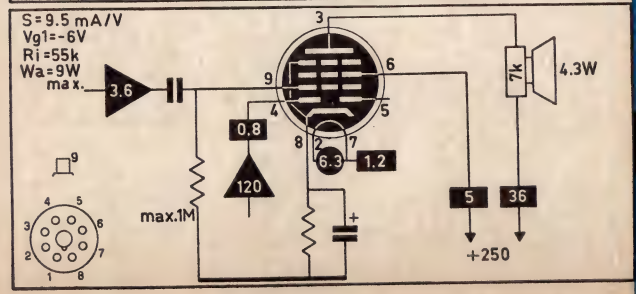



S= 2 mA/V
Vg1= −5.1 V
Ri = 110 k
Wa = 1.2 W max.
4.5
max. 1M
0.05
2.8
0.1
4.5
1.4
1.8
8
+90
8 k
0.34W

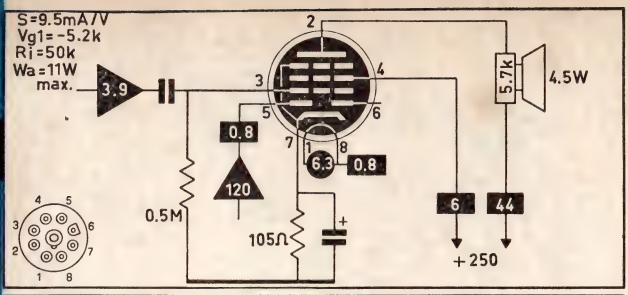

S= 2 m A/V
Vg1= −5.1 V
Ri = 110 k
Wa = 1.2 W max.
2-6
4.5
max. 1M
0.05
2.8
0.1
4.5
1.4
1.8
8
+90
8 k
0.34W


S=9 mA/V
Vg1= -6V
Ri=50 k
Wa=9W max.
3.6
max 0.7M
0.8
120
6.3
1.18
150Ω
4
36
+250
7k
4.3W

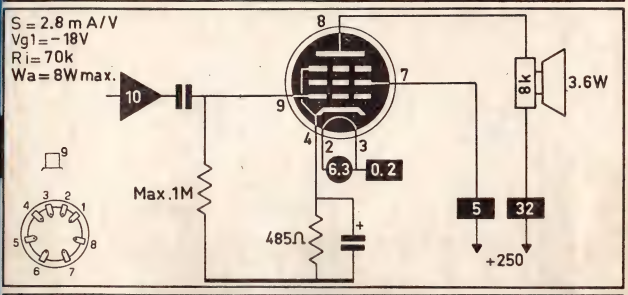

S=9mA/V
Vg1=-6V
Ri=50k
μg2g1=23
Wa=11W max.
4.2
max.1M
0.8
125
6.3
0.8
150Ω
4.5
36
+250
7k
4.5W


S=9.5 mA/V
Vg1=-6V
Ri=55k
Wa=9W max.
3.6
max.1M
0.8
120
6.3
1.2
5
36
+250
7k
4.3W

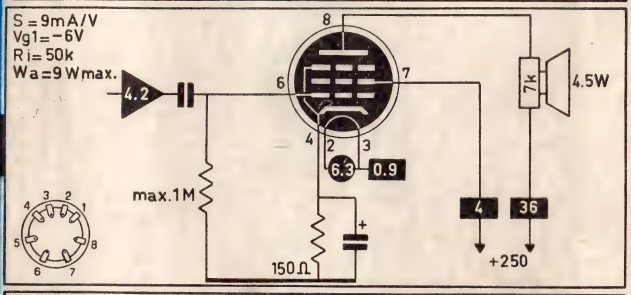
EBL71



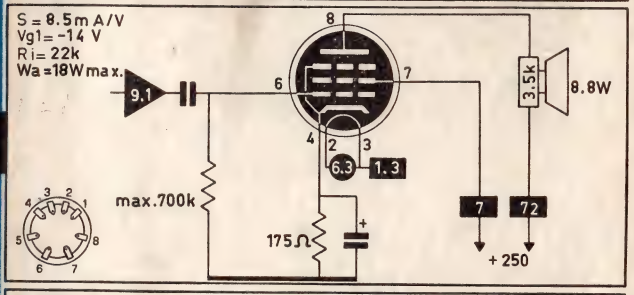
EL2



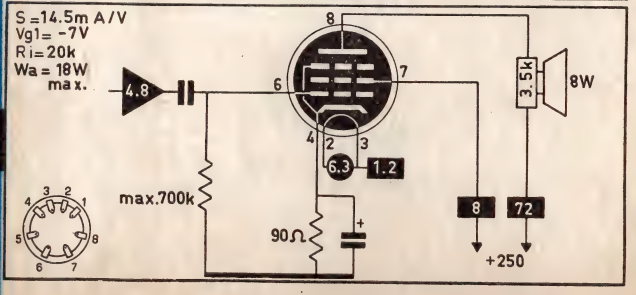
EL3

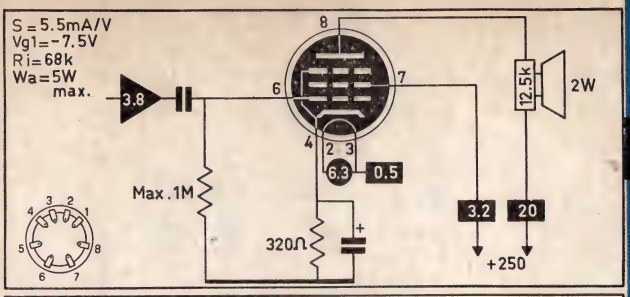


EL5

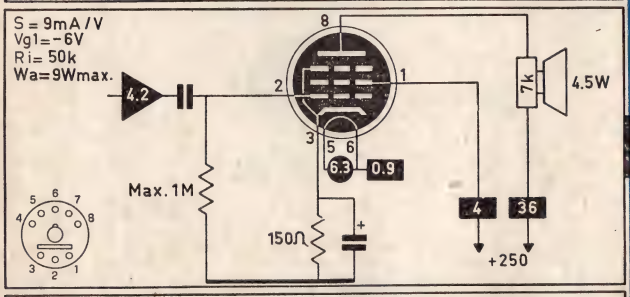


EL6

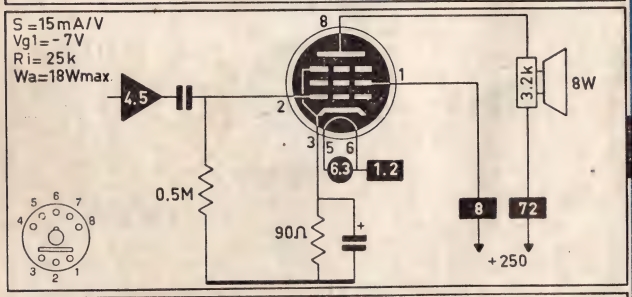




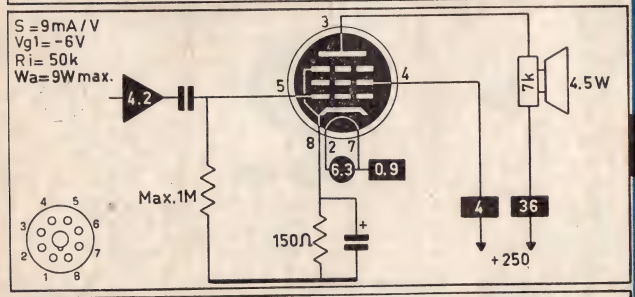
EL8



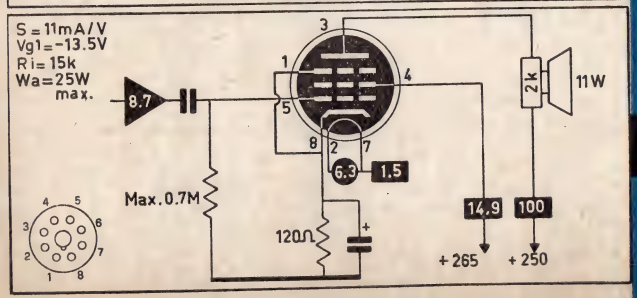
EL11



EL12

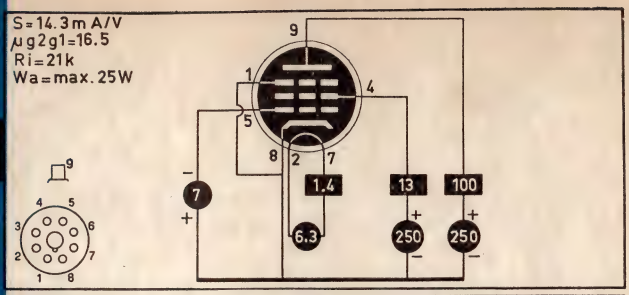


EL33

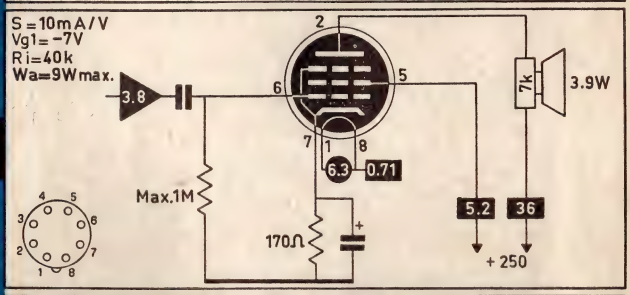


EL34

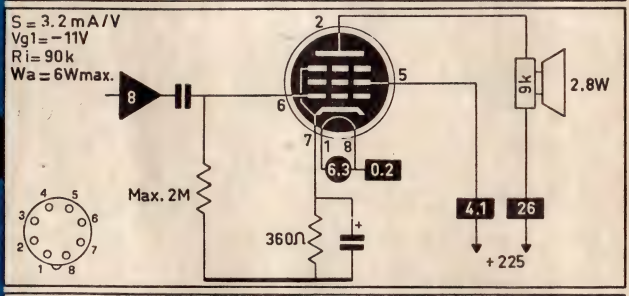
EL38



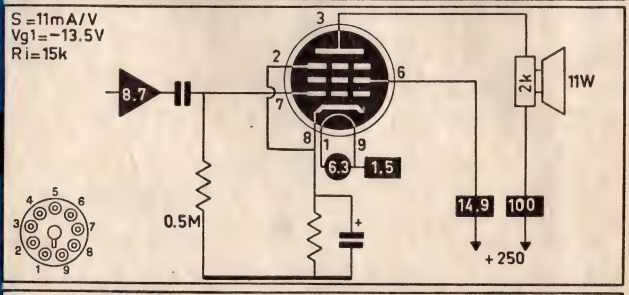
EL41



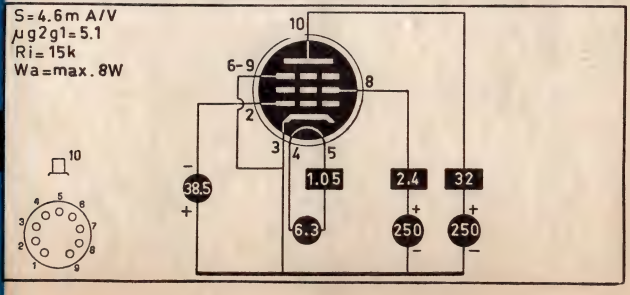
EL42

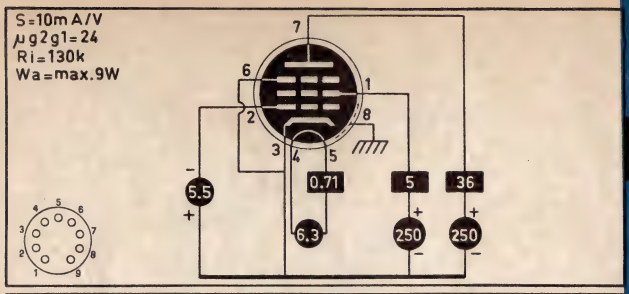


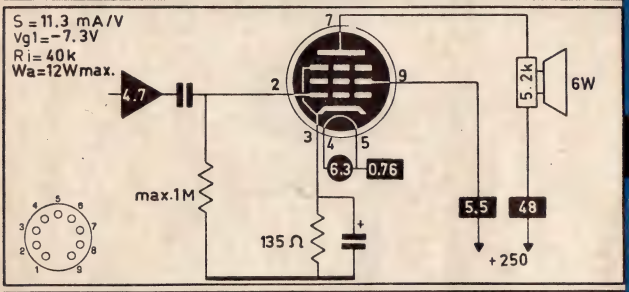
EL60

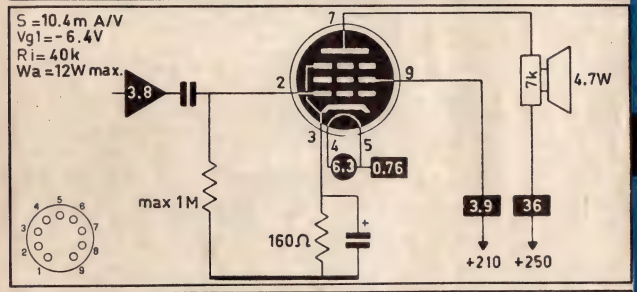


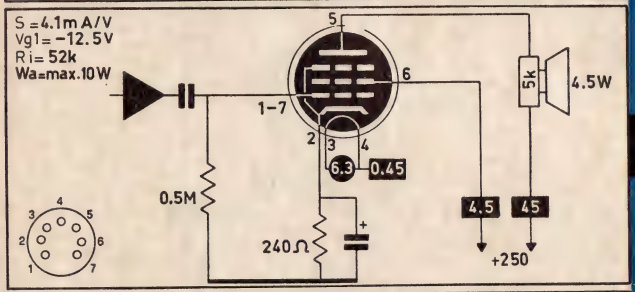
EL81

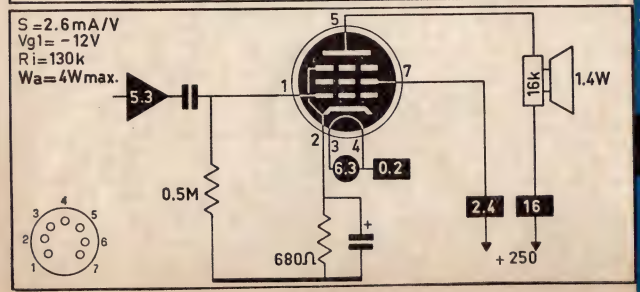



S=10mA/V
μg2g1=24
Ri=130k
Wa=max.9W
5.5
0.71
6.3
5
250
36
250


S=11.3 mA/V
Vg1=−7.3V
Ri=40k
Wa=12Wmax.
4.7
max.1M
135Ω
6.3
0.76
5.2k
6W
5.5
48
+250

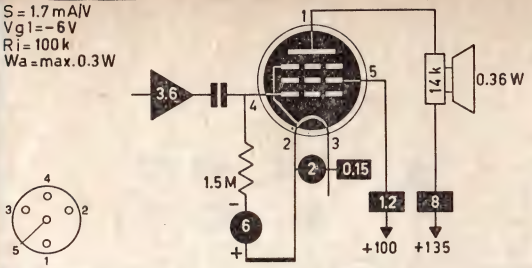

S=10.4m A/V
Vg1=−6.4V
Ri=40k
Wa=12W max.
3.8
max 1M
160Ω
6.3
0.76
7k
4.7W
3.9
36
+210
+250


S=4.1mA/V
Vg1=−12.5V
Ri=52k
Wa=max.10W
1-7
0.5M
240Ω
6.3
0.45
5k
4.5W
4.5
45
+250


S=2.6mA/V
Vg1=−12V
Ri=130k
Wa=4Wmax.
5.3
0.5M
680Ω
6.3
0.2
16k
1.4W
2.4
16
+250

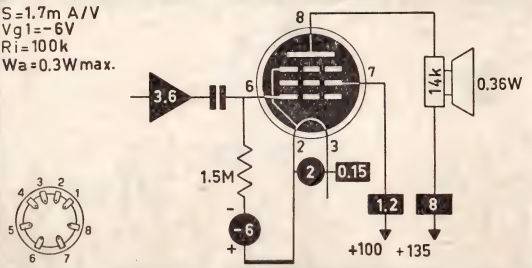
KL1

S = 1.7 mA/V
Vg1 = −6V
Ri = 100k
Wa = max. 0.3W



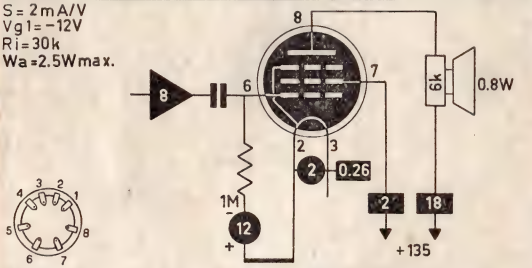
KL1

S = 1.7m A/V
Vg1 = −6V
Ri = 100k
Wa = 0.3W max.



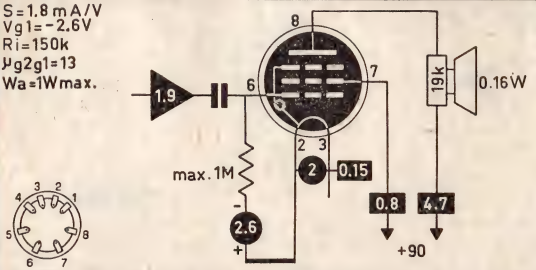
KL2

S = 2 mA/V
Vg1 = −12V
Ri = 30k
Wa = 2.5W max.



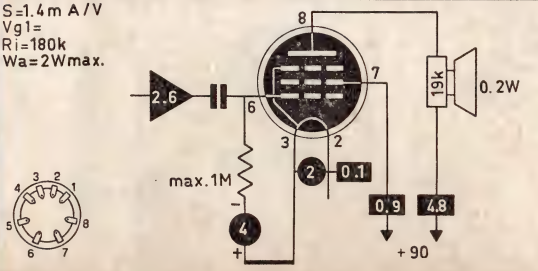
KL4

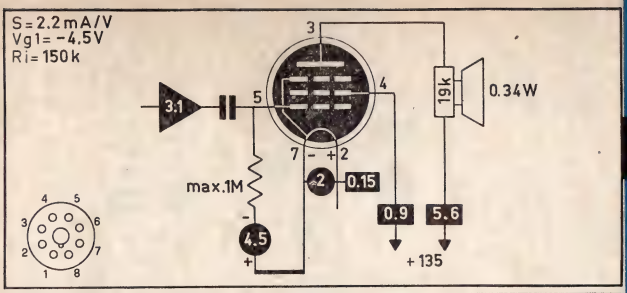
S = 1.8 mA/V
Vg1 = −2.6V
Ri = 150k
μg2g1 = 13
Wa = 1W max.

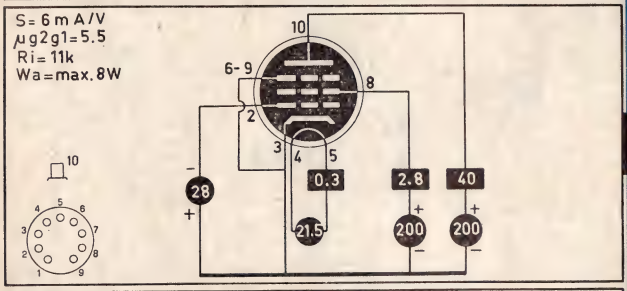


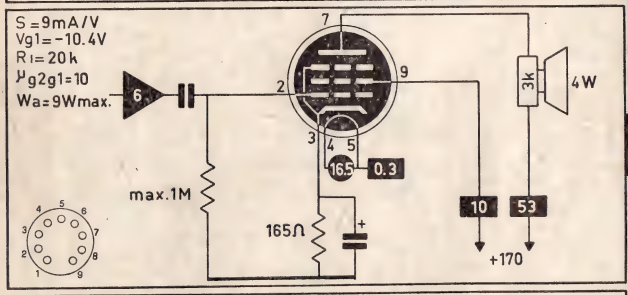
KL5

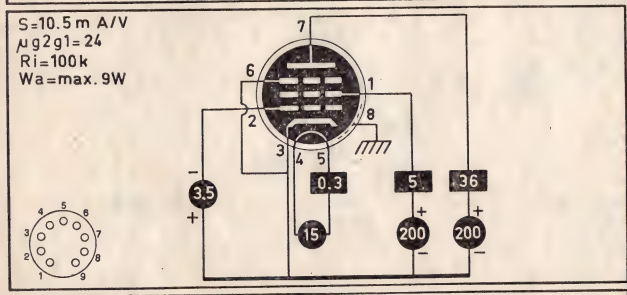
S = 1.4 m A/V
Vg1 =
Ri = 180k
Wa = 2W max.

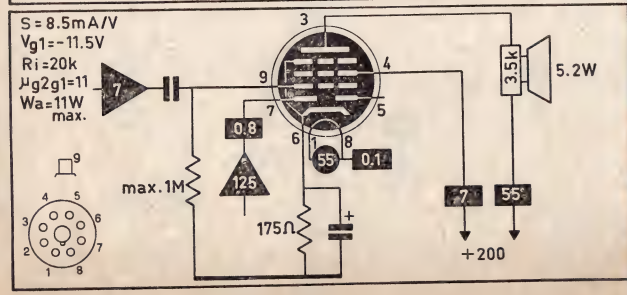



S = 2.2 mA/V
Vg1 = −4.5V
Ri = 150k
3.1
max.1M
4.5
19k
0.34W
0.15
0.9
5.6
+135

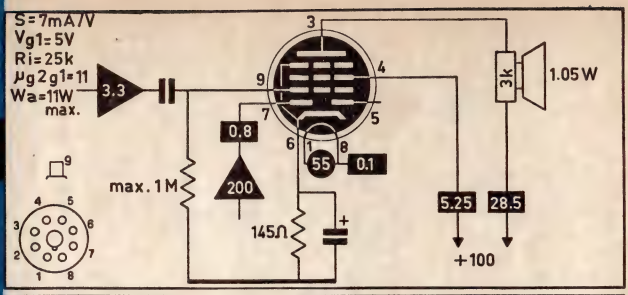

S = 6 mA/V
μg2g1 = 5.5
Ri = 11k
Wa = max. 8W
28
0.3
21.5
2.8
200
40
200


S = 9mA/V
Vg1 = −10.4V
Ri = 20k
μg2g1 = 10
Wa = 9W max.
6
max.1M
165Ω
16.5
0.3
3k
4W
10
53
+170

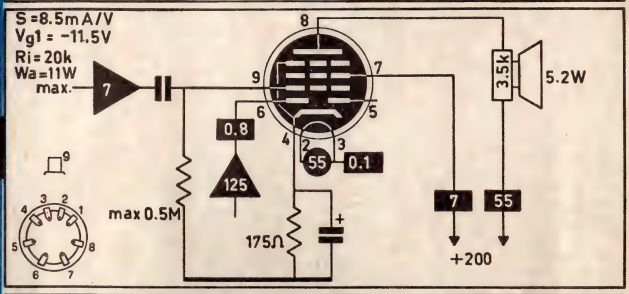

S = 10.5 m A/V
μg2g1 = 24
Ri = 100k
Wa = max. 9W
3.5
0.3
15
5
200
36
200


S = 8.5mA/V
Vg1 = −11.5V
Ri = 20k
μg2g1 = 11
Wa = 11W max.
7
max.1M
125
0.8
175Ω
55
0.1
3.5k
5.2W
7
55
+200

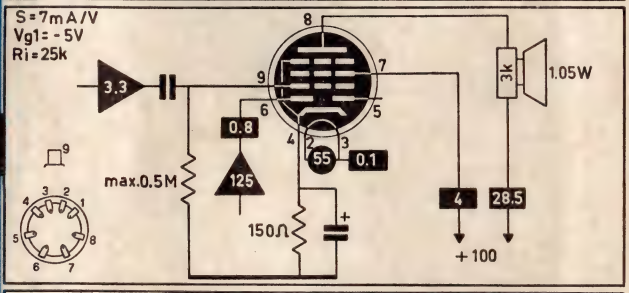
UBL1



UBL3



UBL3



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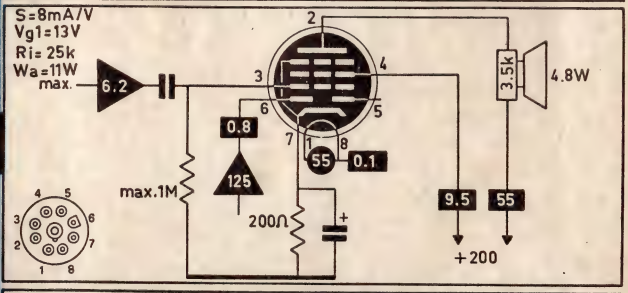

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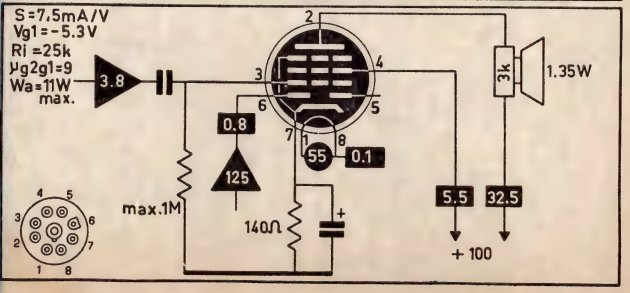

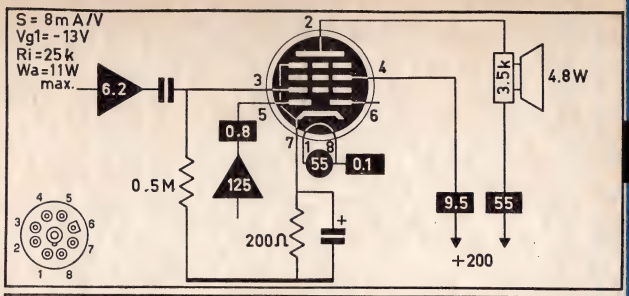

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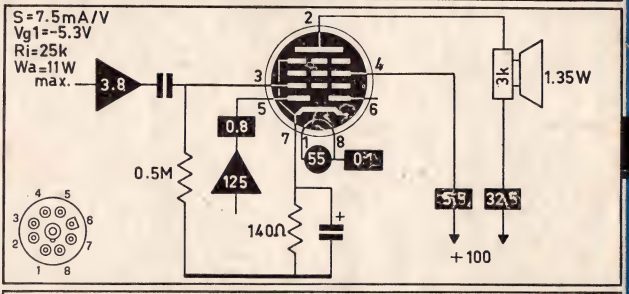

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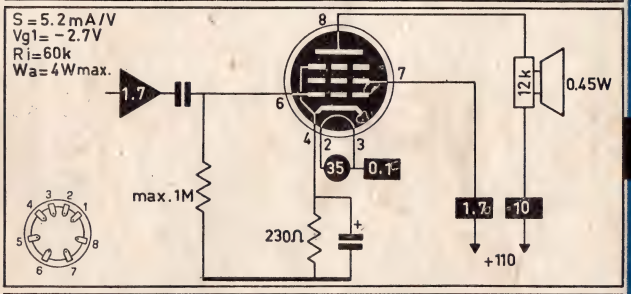
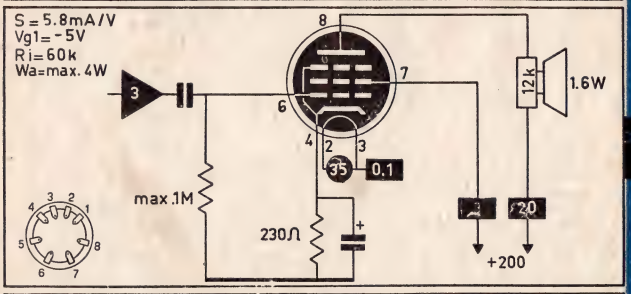


UL2



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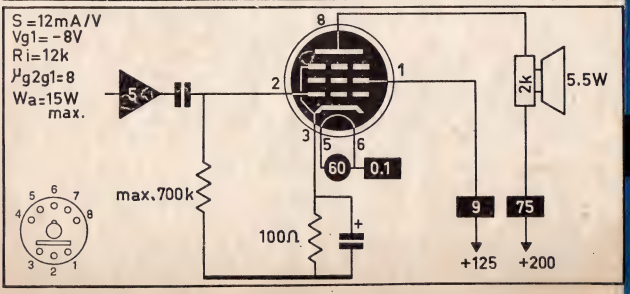
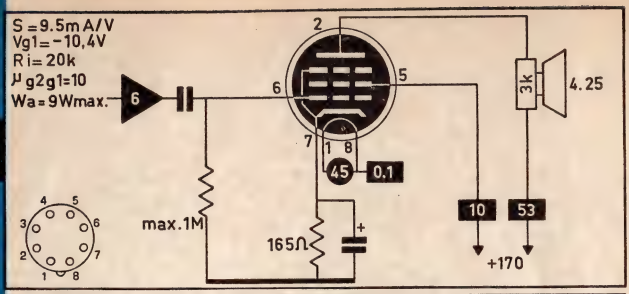


UL12

UL41



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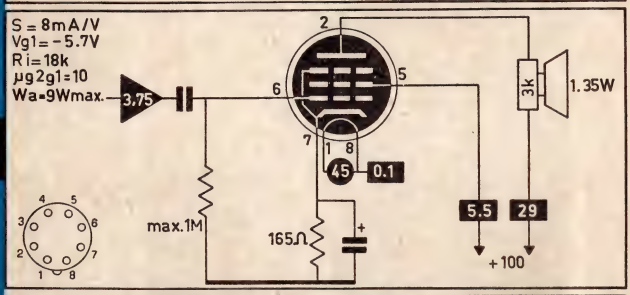
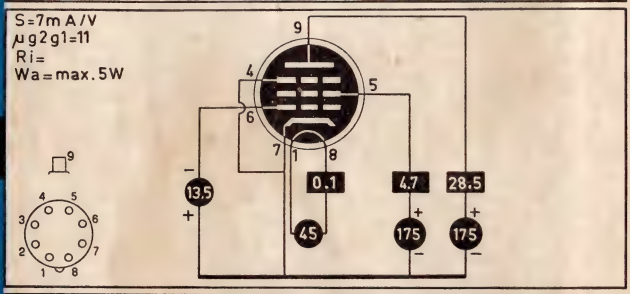
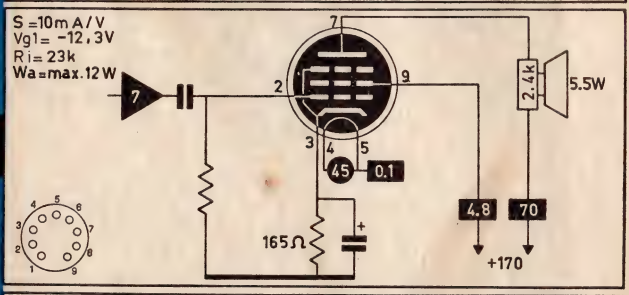


UL44



UL84



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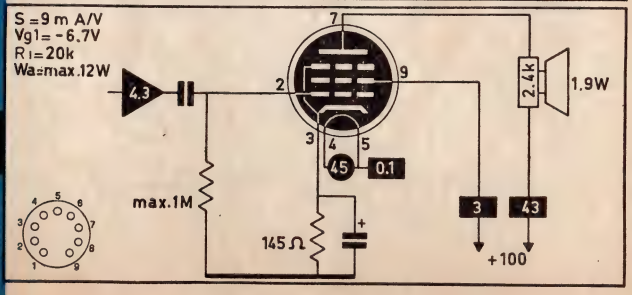
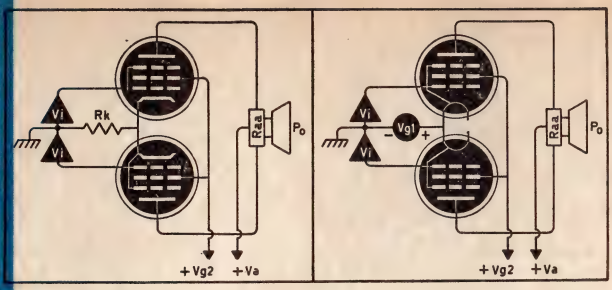


1C5	DL35	-	-
1S4	DL91	-	-
3A4	DL93	-	-
3E5	DL96	-	-
3Q4	DL95	-	-
3Q5	DL33	-	-
3S4	DL92	-	-
3V4	DL94	-	DL95
6AK6	-	6G6	-
6AM5	EL91	-	-
6AQ5	EL90	19AQ5	-
6AV5	-	25AV5	-
6BG6	-	19BG6	-
6BQ5	EL84	-	-
6BW6	-	-	6V6
6CJ6	EL81	-	-
6CK6	EL83	-	-
6G6	-	-	6AK6
6V6	-	-	7C5
6Y6	-	25C6	-
7C5	-	14C5	6BW6
7D9	6AM5	-	-
14C5	-	7C5	-
15A6	PL83	-	-
16A5	PL82	-	-
19AQ5	-	6AQ5	-
19BG6	-	6BG6	-
21A6	PL81	-	-
25AV5	-	6AV5	-
25C6	-	6Y6	-
25L6	-	50L6	-
35A5	-	-	35L6

	=		
35B5	-	-	35C5
35C5	-	-	35B5
35L6	-	-	35A5
50L6	-	25L6	-
4699	-	EL6	-
ABL1	-	EBL1	-
AL4	-	EL3	-
AL5	-	EL5	-
CBL1	-	-	CBL31
CBL31	-	-	CBL1
DL33	3Q5	-	-
DL35	1C5	-	-
DL91	1S4	-	-
DL92	3S4	-	-
DL93	3A4	-	-
DL94	3V4	-	DL95
DL95	3Q4	-	DL94
DL96	3E5	-	-
EBL1	-	ABL1	EBL31
EBL21	EBL71	-	-
EBL31	-	-	EBL1
EBL71	EBL21	-	-
EL3	-	AL4	EL33
EL5	-	AL5	-
EL6	-	4699	EL12
EL11	-	-	EL3
EL12	-	-	EL6
EL33	-	-	EL3
EL34	-	-	EL60
EL60	-	-	EL34
EL81	6CJ6	-	-
EL83	6CK6	-	-

EL84	6BQ5	–	–
EL90	6AQ5	19AQ5	–
EL91	6AM5	–	–
PL81	21A6	–	–
PL82	16A5	–	–
PL83	15A6	–	–
UBL1	–	–	UBL3
UBL3	–	–	UBL1
UBL21	UBL71	–	–
UBL71	UBL21	–	–



	Va	Vg2	Vi	Ia	Ig2	Rk	Raa	Po	D
	V	V	V	mA	mA	Ω	k	W	%
			(max)	(Vi=0)					
3E5	90	90	2 x7,9	2 x3,25	2 x0,6	560	20	0,42	4
3Q4	120	120	2 x9,9	2 x5,7	2 x1,25	470	14	0,9	5
3V4	120	120	2 x9,9	2 x5,7	2 x1,25	470	14	0,9	5
6AM5	250	250	2 x12	2 x11	2 x1,6	600	24	4	3,2
6AQ5	250	250	2 x15	2 x35	2 x2,5	200	10	10	5
6F6	315	285	2 x24	2 x31	2 x6	320	10	11	4
6L6	360	270	2 x20	2 x44	2 x2,5	250	9	24,5	4
6V6	285	285	2 x19	2 x35	2 x2	260	8	14	3,5
7C5	250	250	2 x15	2 x35	2 x2,5	200	10	10	5
14C5	250	250	2 x15	2 x35	2 x2,5	200	10	10	5
19AQ5	250	250	2 x15	2 x35	2 x2,5	200	10	10	5
807	500	300	2 x25	2 x50	2 x1,5	270	9	32,5	2,7
4654	425	425	2 x27	2 x46,5	2 x5,4	265	6,5	27,5	5
4699	375	375	2 x14	2 x52	2 x6,5	125	6	27,5	4
AL4	250	250	2 x6,7	2 x24	2 x2,8	140	10	8,2	3,1
AL5	375	275	2 x16	2 x48	2 x5	165	6,5	28,5	2,3
CL4	200	200	2 x14	2 x33	2 x3,5	135	4,5	8	2,5
CL6	200	125	2 x11	2 x45	2 x5	250	4,5	12,1	1,8
DL41	90	90	2 x5	2 x1,5	2 x0,25	*/	18	0,48	5
DL94	120	120	2 x9,9	2 x5,7	2 x1,25	470	14	0,9	5
DL95	120	120	2 x9,9	2 x5,7	2 x1,25	470	14	0,9	5
DL96	90	90	2 x7,9	2 x3,25	2 x0,6	560	20	0,42	4

*/: Vg1 = -6,4V

Va	Vg2	Vi	Ia	Ig2	Rk	Raa	Po	D	
V	V	V	mA	mA	Ω	k	W	%	
		(max)	(Vi=0)						
300	300	2x7	2x30	2x3,8	130	9	13,2	1,8	EBL21
250	250	2x17	2x27,5	2x4,5	300	8	8	1,4	EL2
250	250	2x6,7	2x24	2x2,8	140	10	8,2	3,1	EL3
250	275	2x13	2x58	2x6,25	120	4,5	19,5	5,1	EL5
250	250	2x7,3	2x45	2x5,1	90	5	14,5	2,2	EL6
250	250	2x6,7	2x24	2x2,8	140	10	8,2	3,1	EL8
250	250	2x7,3	2x45	2x5,1	90	5	14,5	2,2	EL12
250	250	2x6,7	2x24	2x2,8	140	10	8,2	3,1	EL33
350	350	2x21	2x75	2x11,5	130	3,4	35	5	EL34
250	250	2x5,6	2x36	2x5,2	85	7	9,4	4,6	EL41
250	250	2x13	2x20	2x3,2	310	15	7	5,5	EL42
350	350	2x21	2x75	2x11,5	130	3,4	35	5	EL60
300	300	2x10	2x36	2x4	130	8	17	4	EL84
250	250	2x15	2x35	2x2,5	200	10	10	5	EL90
250	250	2x12	2x12,8	2x4,1	600	24	4	3,2	EL91
135	135	2x6,2	2x1,5	2x0,3	*/	35	0,8	7,8	KL4
135	135	2x8,7	2x2	2x0,35	**/	25	1,05	7	KL5
200	200	2x14	2x45	2x8,5	135	4	12	5	PL82
200	200	2x12	2x50	2x7,8	116	4	12,5	3,9	UBL21
170	170	2x9,3	2x44	2x8,8	100	4	9	4	UL41

*/: Vg1 = -8V **/: Vg1 = -12V

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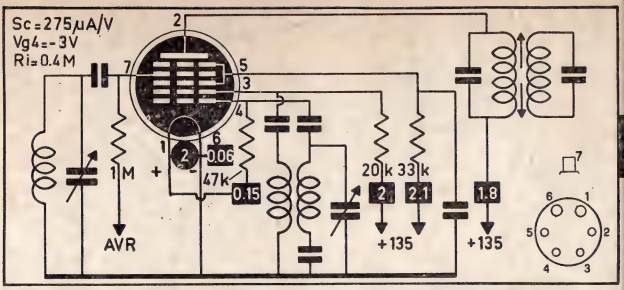
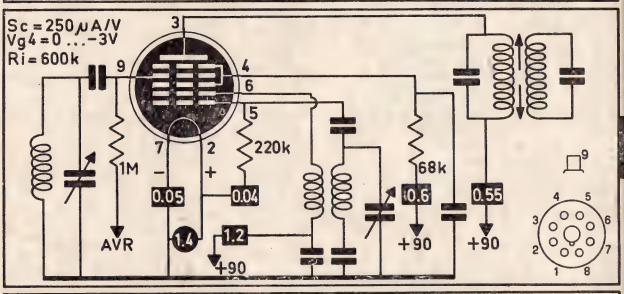


1A6



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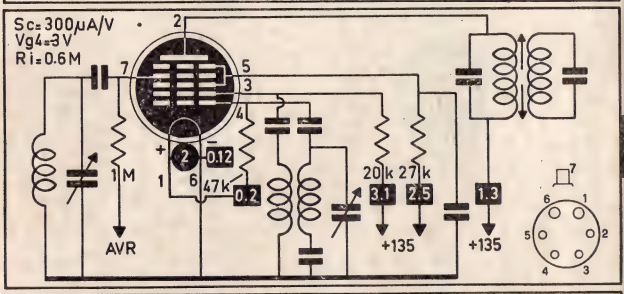

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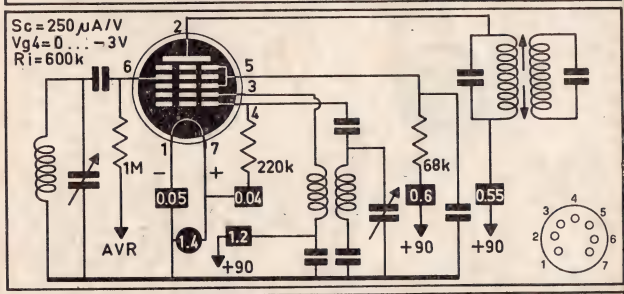

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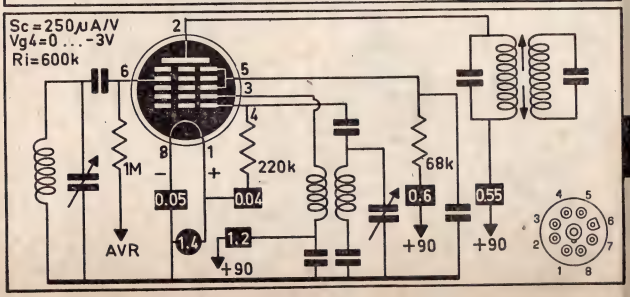
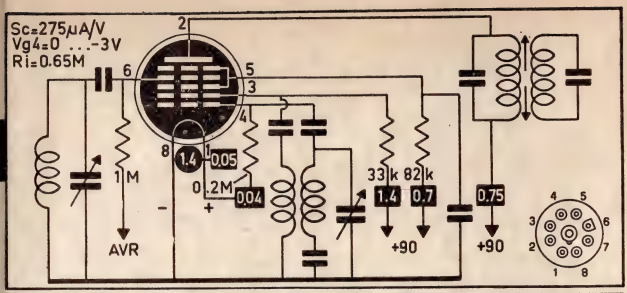
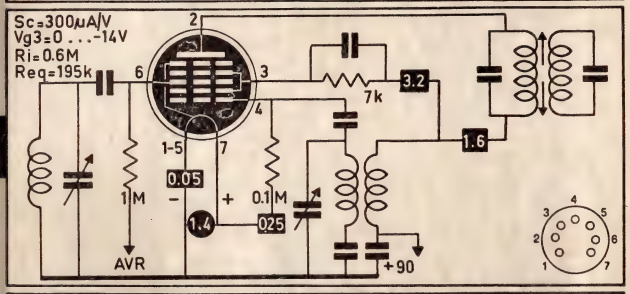


1LA6

1LC6



1R5



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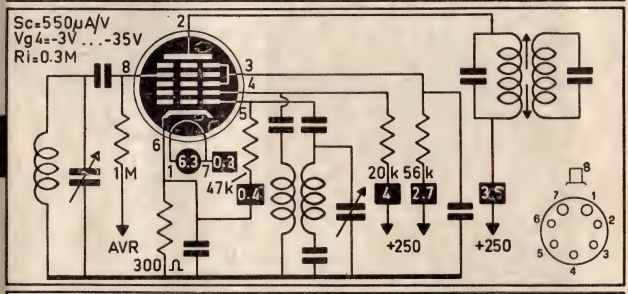

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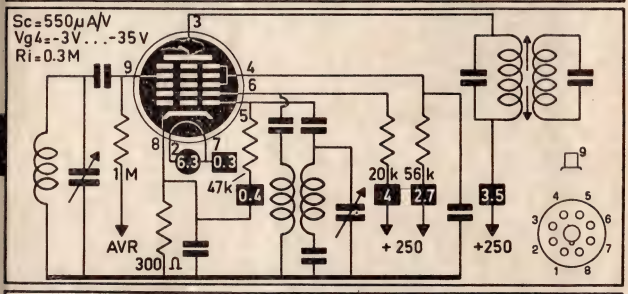

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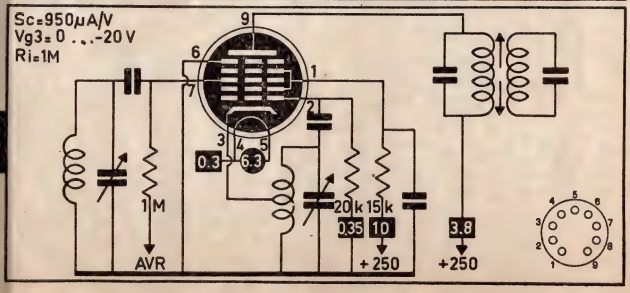

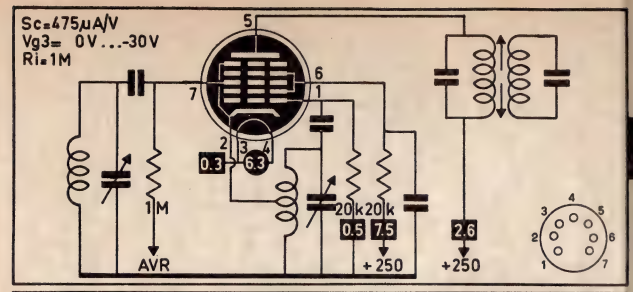

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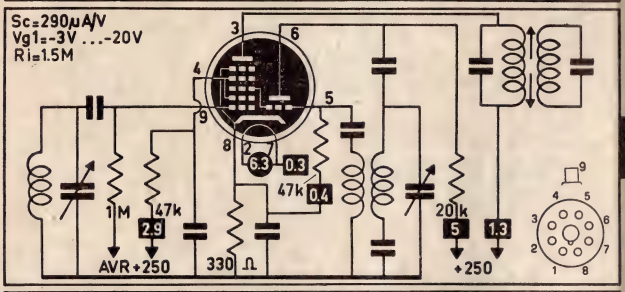

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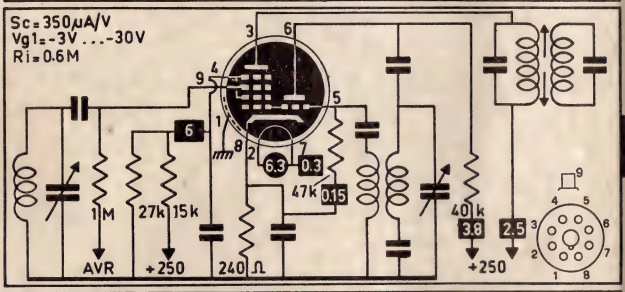

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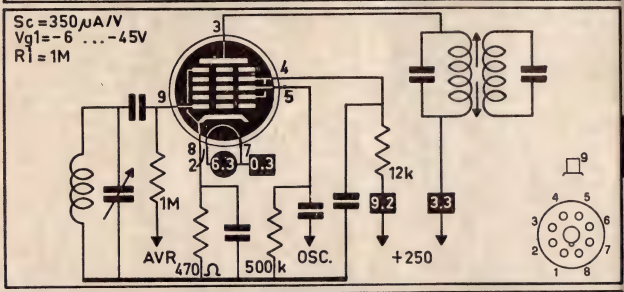

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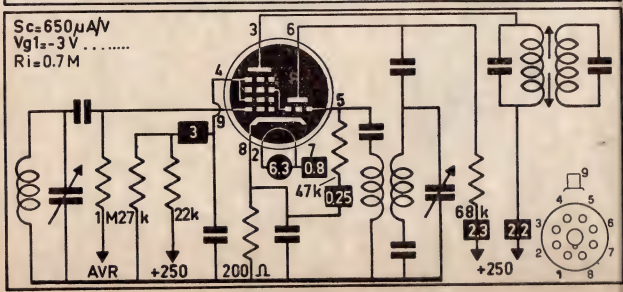

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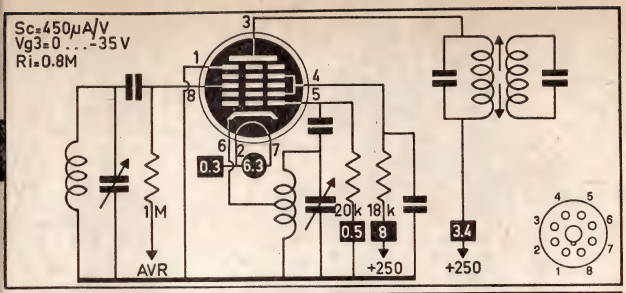

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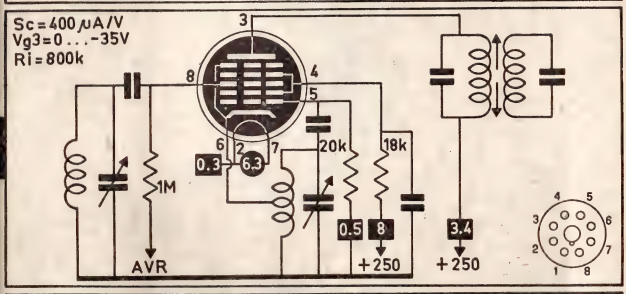

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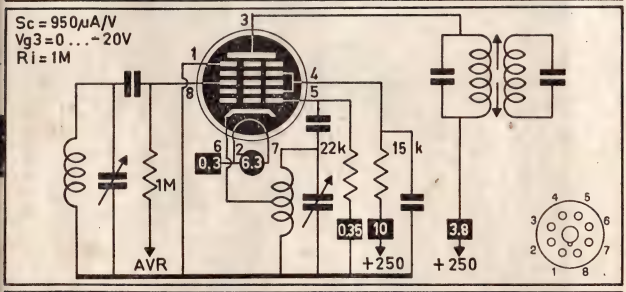

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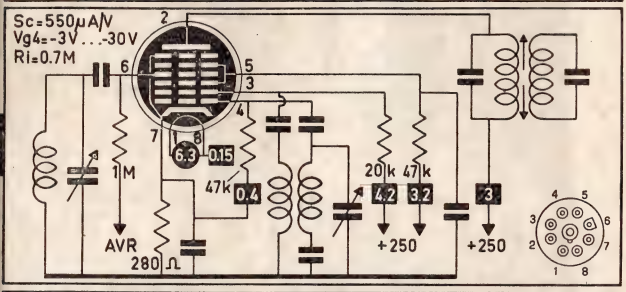

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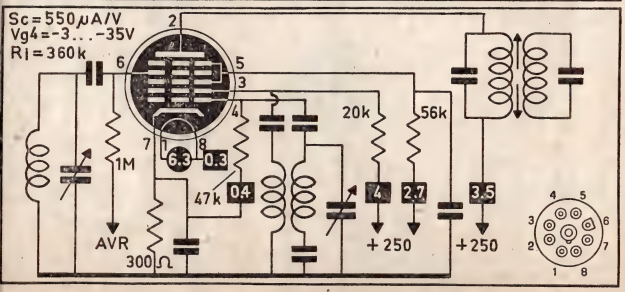

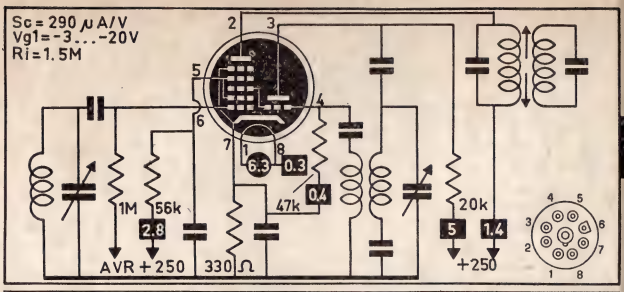

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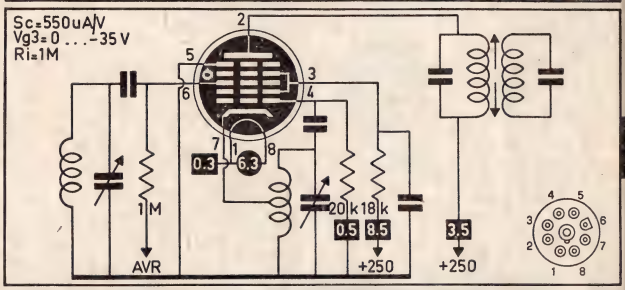

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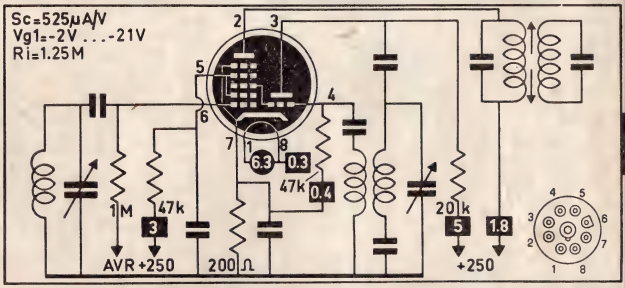

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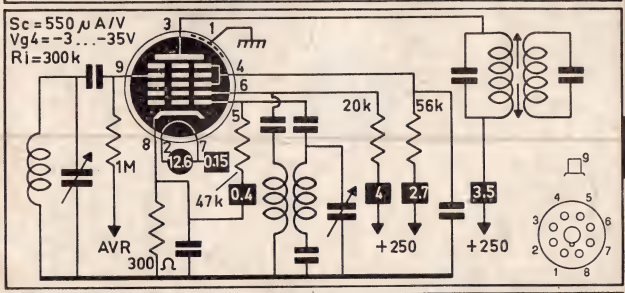

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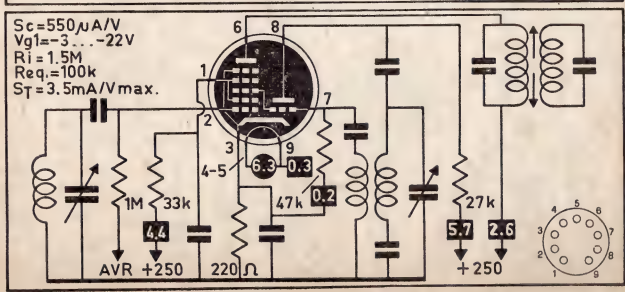

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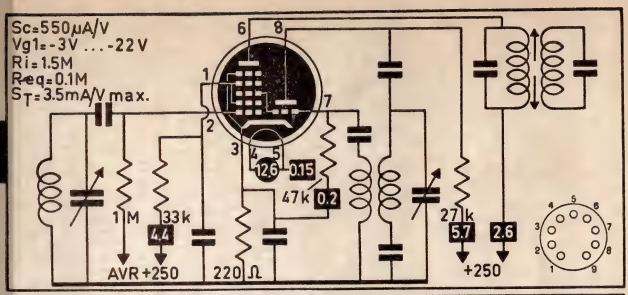

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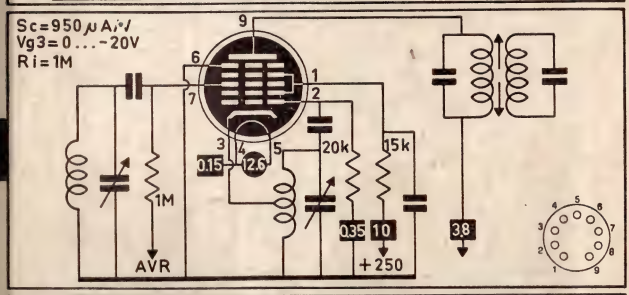

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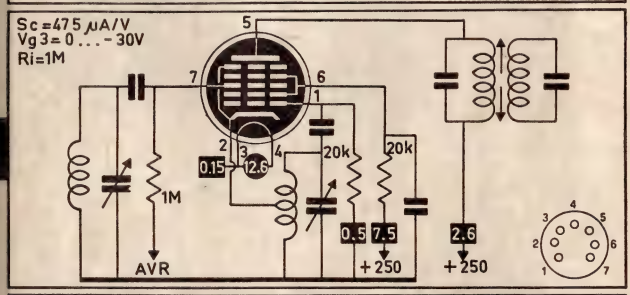

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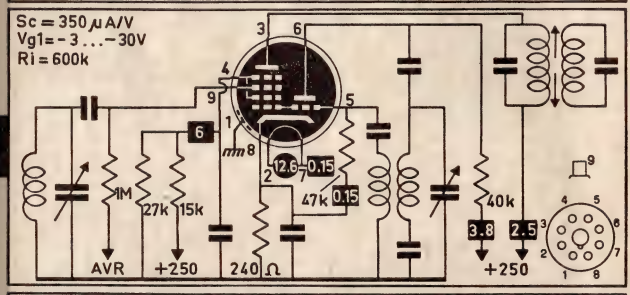

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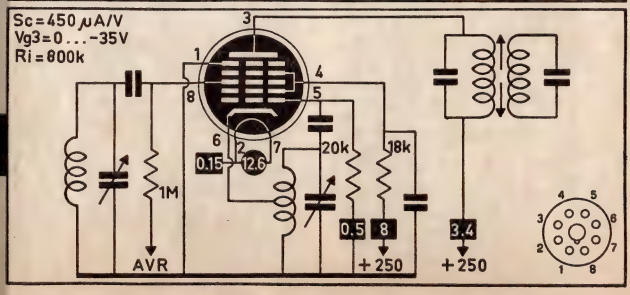

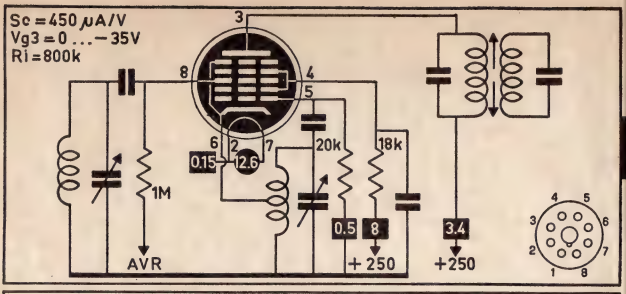

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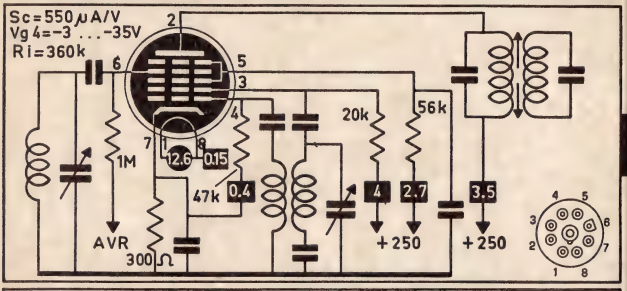

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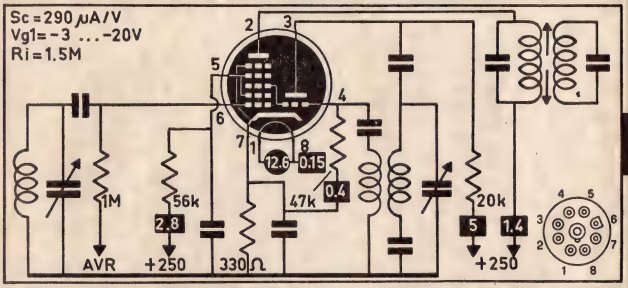

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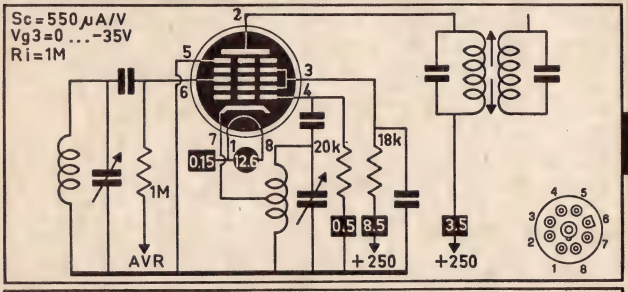

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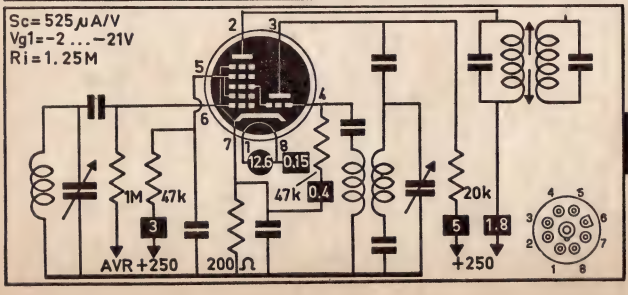

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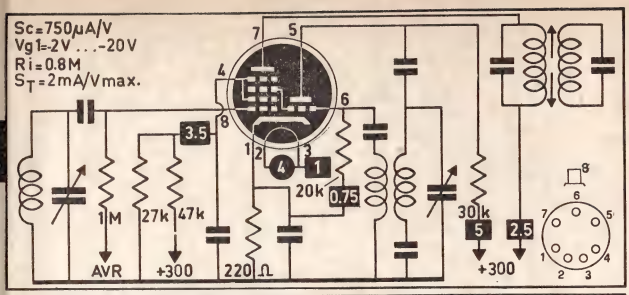

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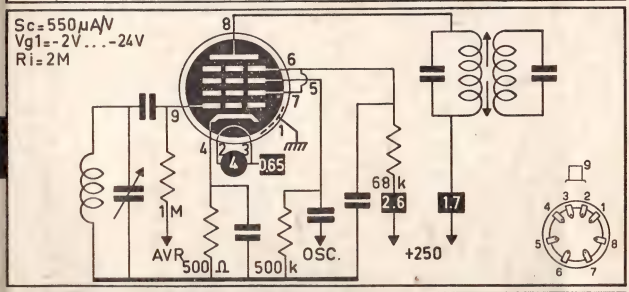

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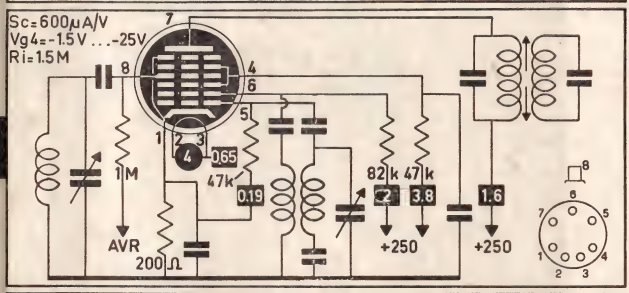

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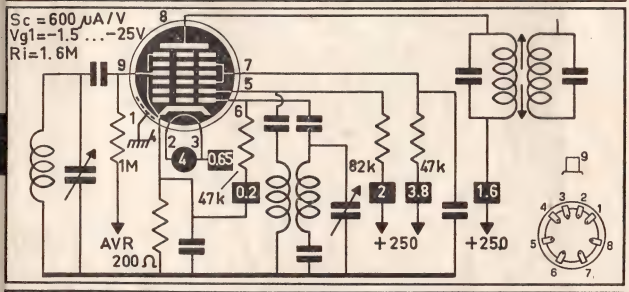

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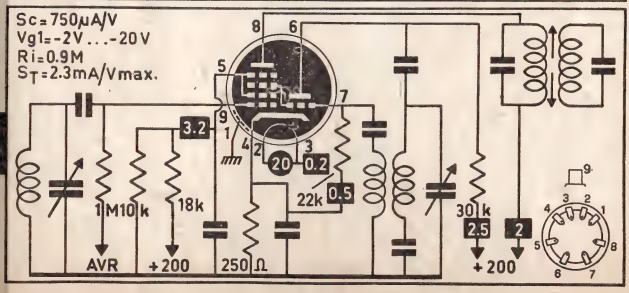

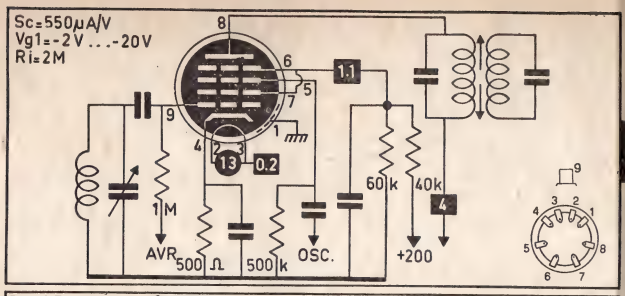

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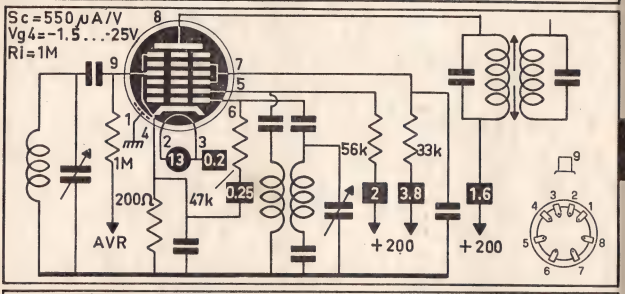

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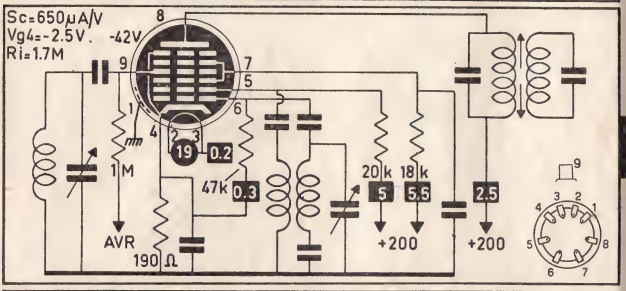

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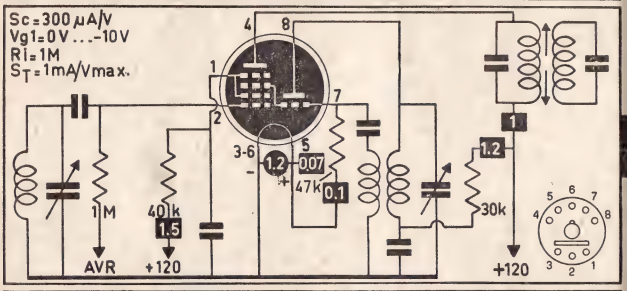

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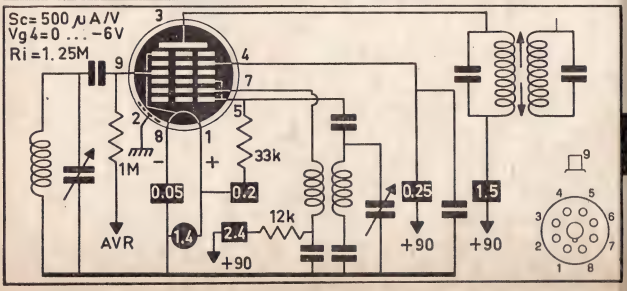

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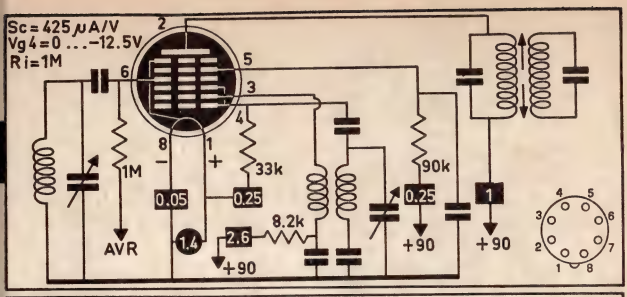

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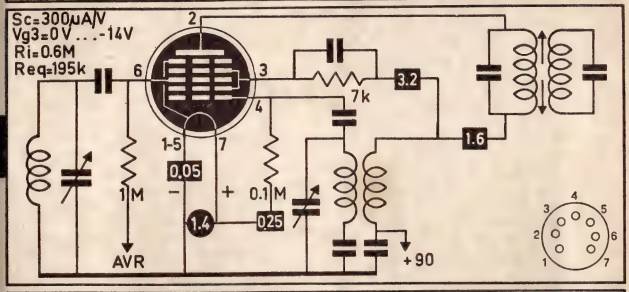

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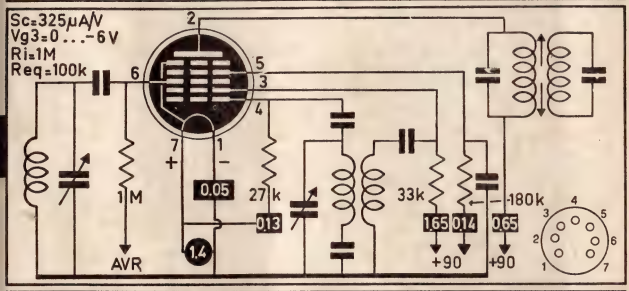

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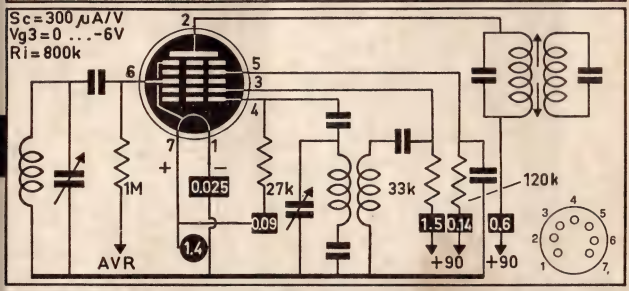

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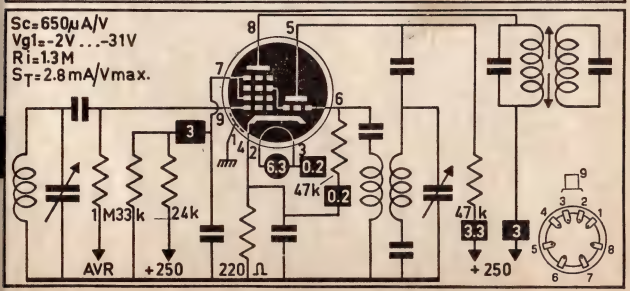

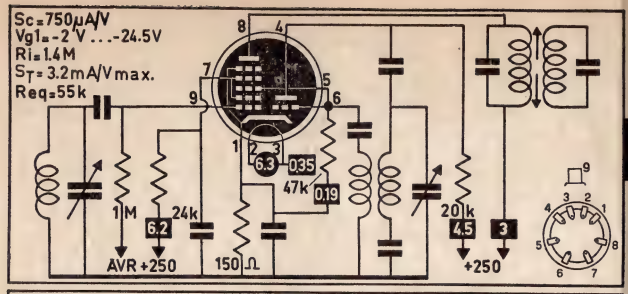

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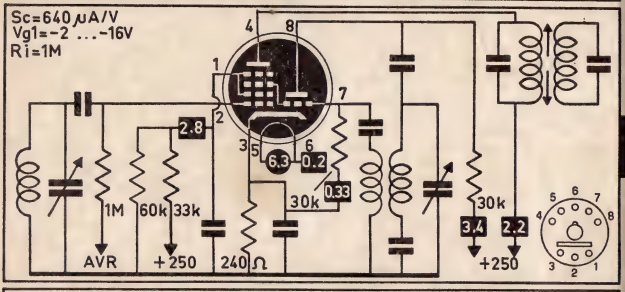

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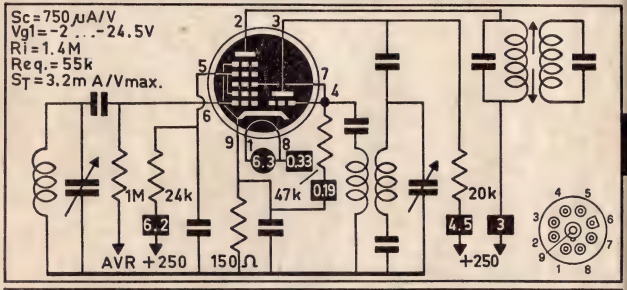

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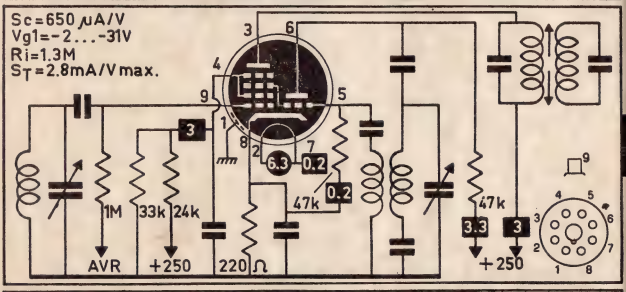

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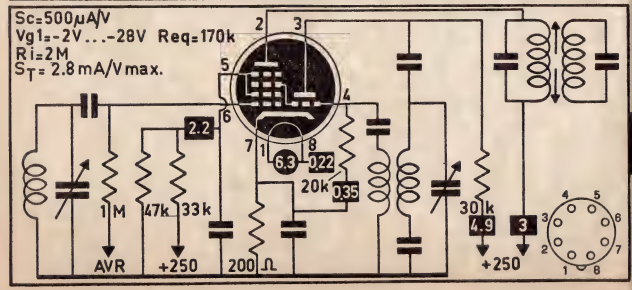

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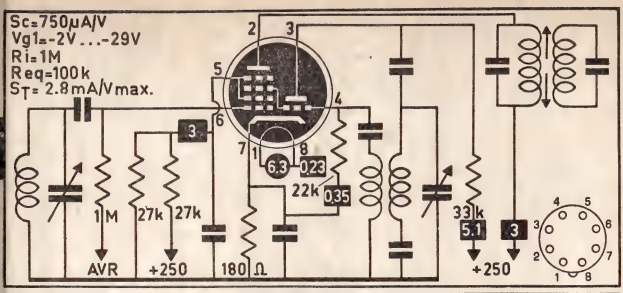

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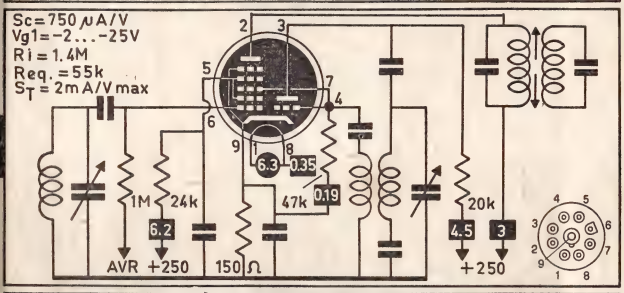

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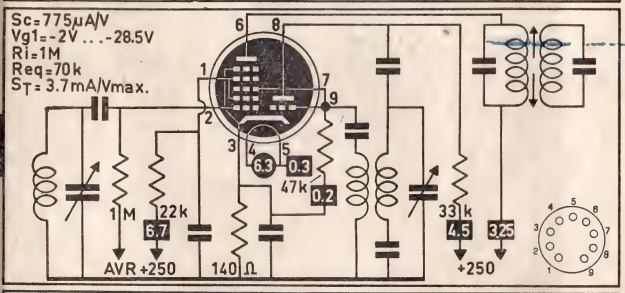

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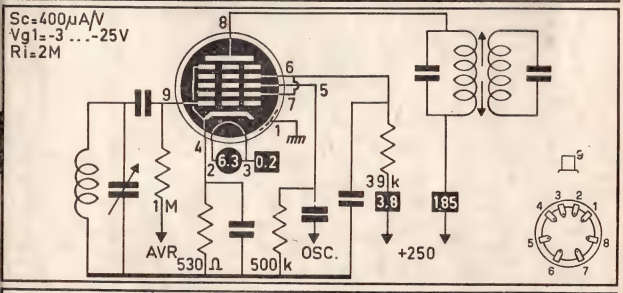

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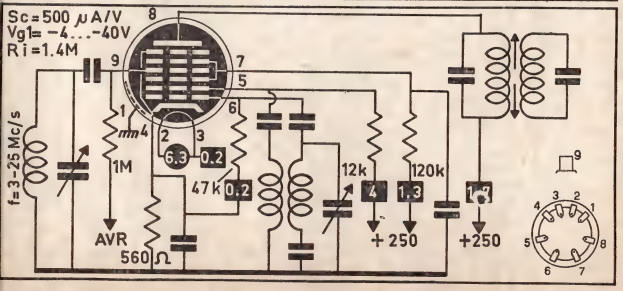

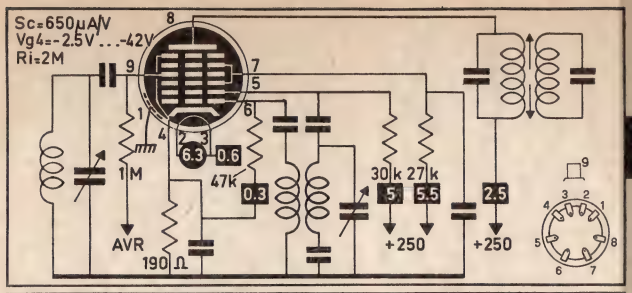

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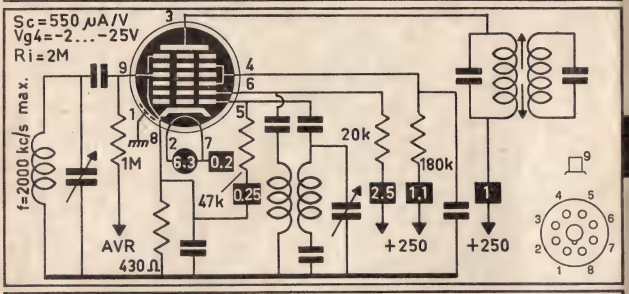

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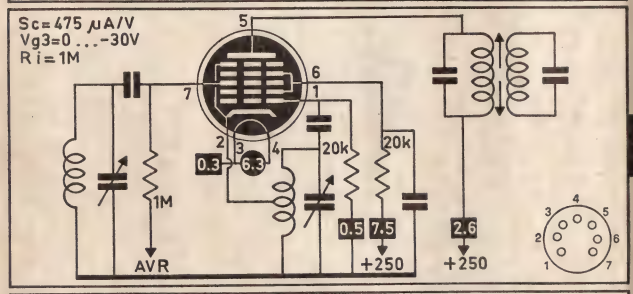

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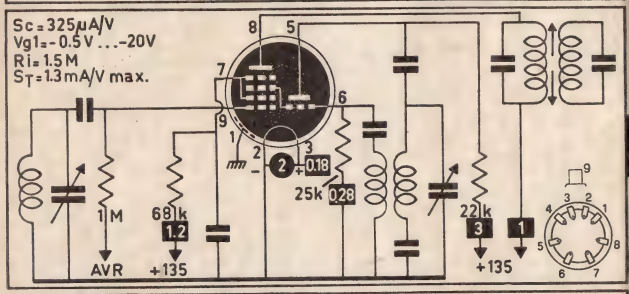

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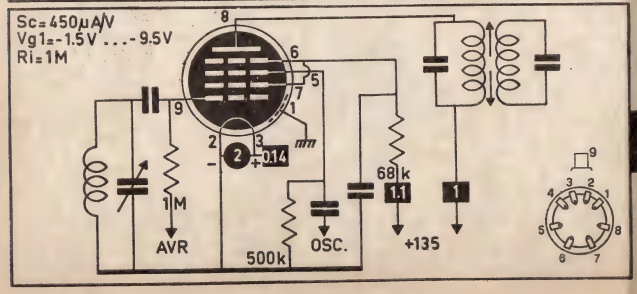
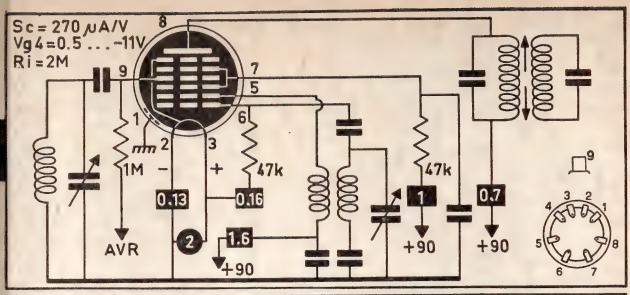
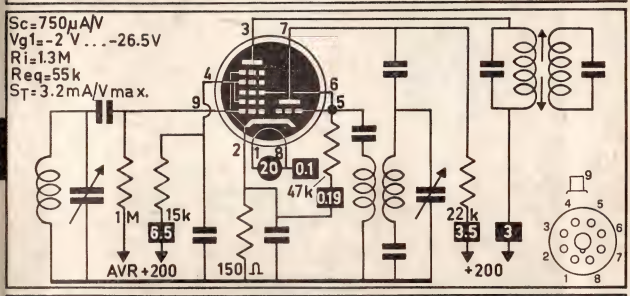


KH1

KK2



UCH4



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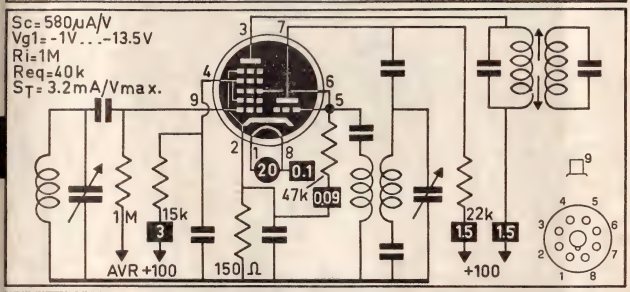

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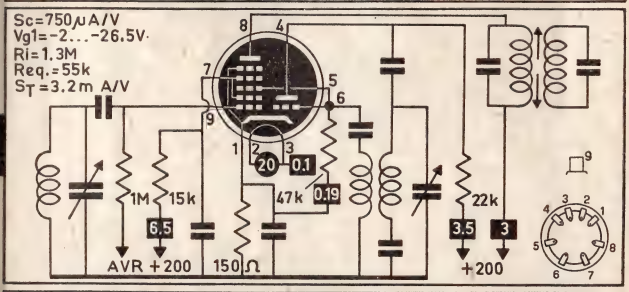

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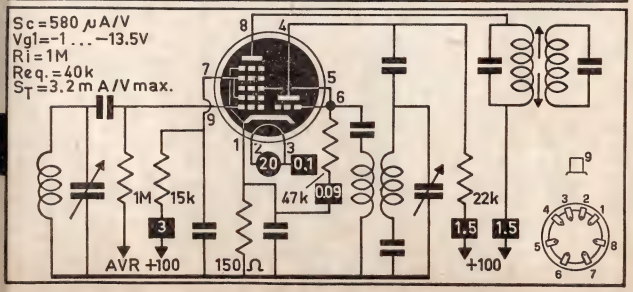
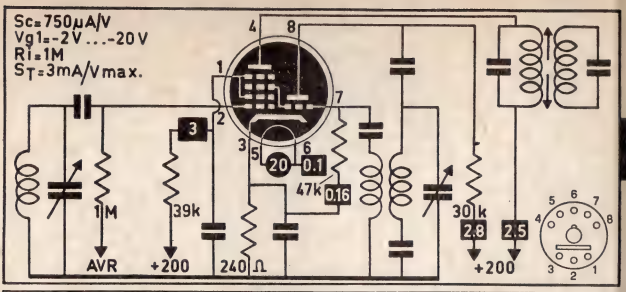
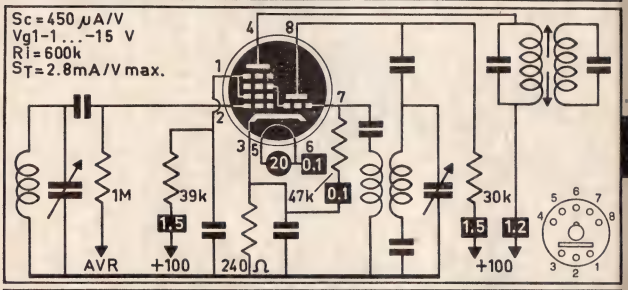



Sc=750µA/V
Vg1=-2V...-20V
Ri=1M
ST=3mA/V max.
UCH11
1M
39k
240Ω
47k
30k
AVR
+200
+200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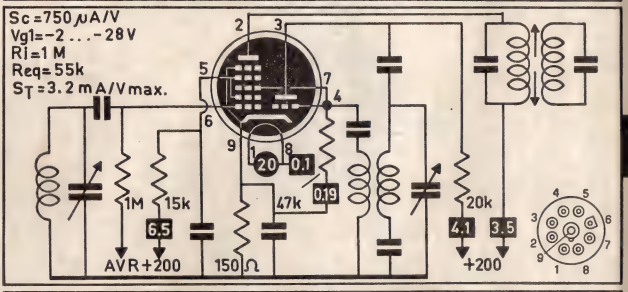
UCH11
1M
39k
240Ω
47k
30k
AVR
+100
+100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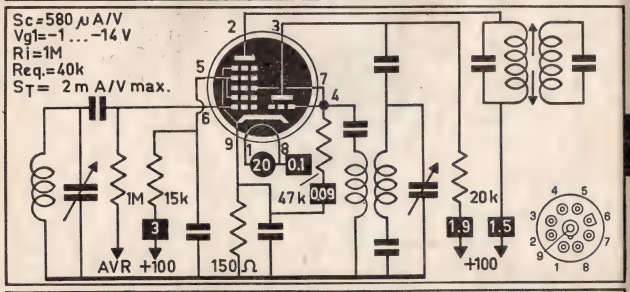
Vg1=-2...-28V
Ri=1M
Req=55k
ST=3.2mA/V max.
UCH21
1M
15k
150Ω
47k
20k
AVR+200
+200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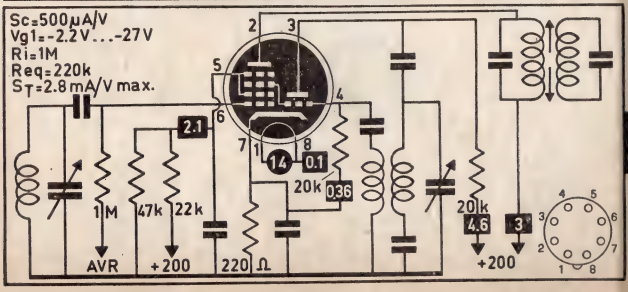
Vg1=-1...-14V
Ri=1M
Req=40k
ST= 2mA/V max.
UCH21
1M
15k
150Ω
47k
20k
AVR
+100
+100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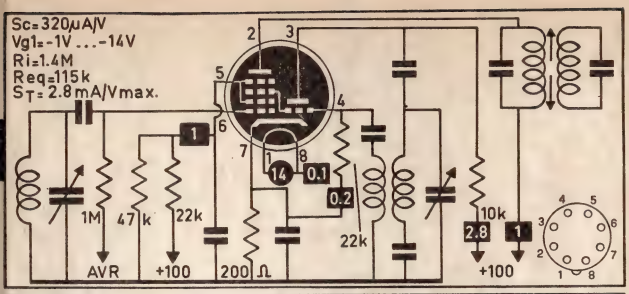
Vg1=-2.2V...-27V
Ri=1M
Req=220k
ST=2.8mA/V max.
UCH41
1M
47k
22k
220Ω
20k
20k
AVR
+200
+200

UCH41



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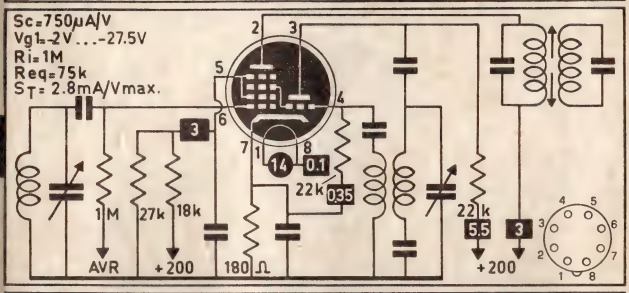

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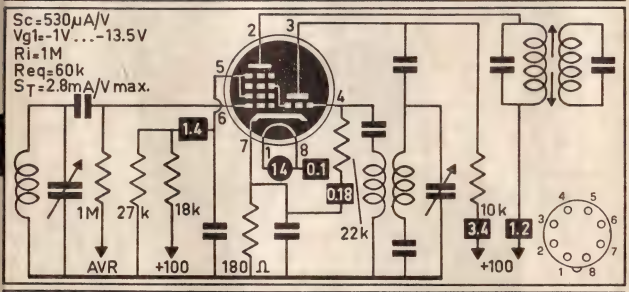
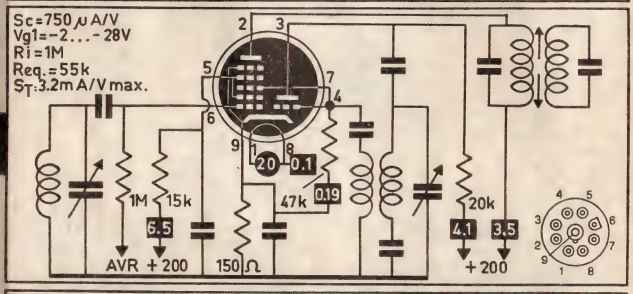


UCH71



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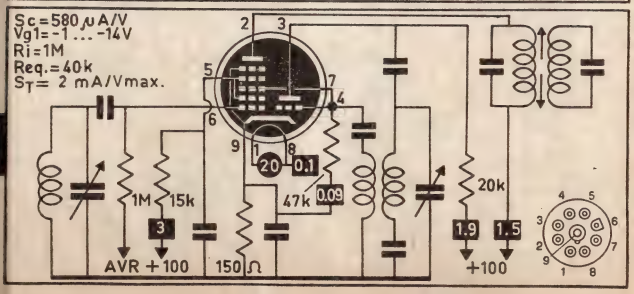
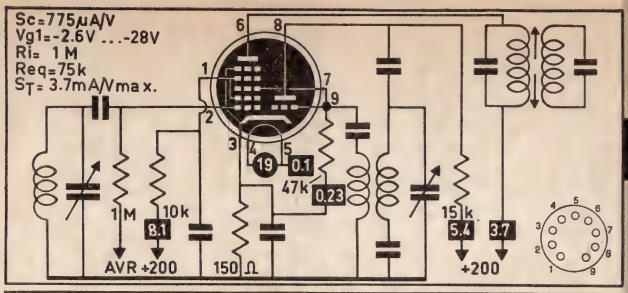
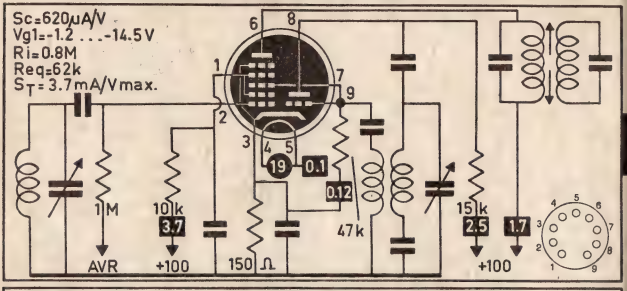


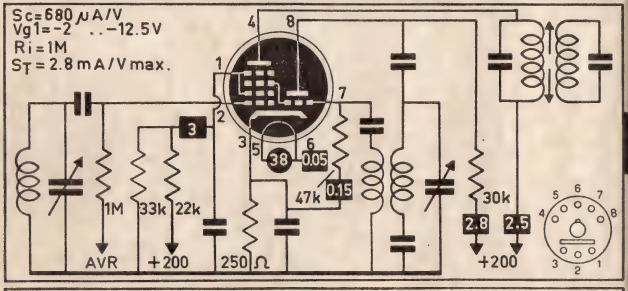
UCH81



UCH81



VCH11



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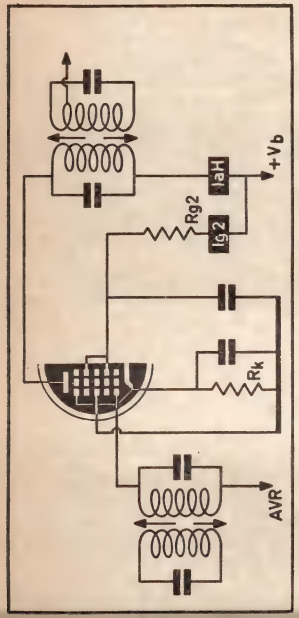
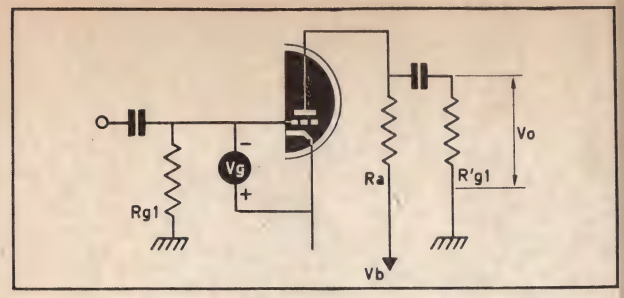
1AB6	DK96	-	-
1AC6	DK92	-	-
1LA6	-	-	1A7
1R5	DK91	-	-
6A7	-	-	6A8
6A8	-	12A8	6A7
6AJ8	ECH81	19AJ8	-
6BA7	-	12BA7	-
6BE6	EK90	12BE6	-
6SA7	-	12SA7	6SA7 GT
6SA7 GT	-	12SA7GT	6SA7
6K8	-	12K8	-
7B8	-	14B8	-
7J7	-	14J7	-
7Q7	-	14Q7	-
7S7	-	14S7	-
12A8	-	6A8	6A7
12BA7	-	6BA7	-
12BE6	-	6BE6	-
12K8	-	6K8	-
12SA7	-	6SA7	12SA7 GT
12SA7GT	-	6SA7 GT	12SA7
14B8	-	7B8	-
14J7	-	7J7	-
14Q7	-	7Q7	-
14S7	-	7S7	-
19AJ8	-	6AJ8	-
AK1	-	CK1	AK2
AK2	-	-	AK1
CK1	-	AK1	AK1
DK32	1A7	-	1LA6

DK91	1R5	-	-
DK92	1AC6	-	-
DK96	1AB6	-	-
ECH3	-	-	ECH35
ECH4	-	-	ECH21
ECH21	ECH71	-	ECH4
ECH35	-	-	ECH3
ECH71	ECH21	-	ECH4
ECH81	6AJ8	19AJ8	-
EK90	6BE6	12BE6	-
UCH4	-	-	UCH5
UCH5	-	-	UCH21
UCH21	UCH71	-	UCH4
UCH71	UCH21	-	UCH4



	Va	Vg1	Rg2	Vg2	Ig2	Ia	Rk	S	Ri	μg2g1	Req
	V	V	k	V	mA	mA	Ω	mA/V	M	—	k
ECH4	250	-2...-44	47	90	3,5	5,3	220	2,2	0,9	18	7,5
ECH21	250	-2...-44	47	90	3,5	5,3	220	2,2	0,9	18	7,5
ECH71	250	-2...-44	47	90	3,5	5,3	220	2,2	0,9	18	7,5
ECH81	250	-2...-42	39	100	3,8	6,5	220	2,4	0,7	20	8,5
UCH4	200	-2...-36	33	94	3,5	5,2	220	2,2	0,7	19	9
UCH4	100	-1...-20	33	50	1,9	2,6	220	2	0,7	19	4,9
UCH21	200	-2...-36	33	94	3,5	5,2	220	2,2	0,7	19	9
UCH21	100	-1...-20	33	50	1,9	2,6	220	2	0,7	19	4,9
UCH71	200	-2...-36	33	94	3,5	5,2	220	2,2	0,7	19	9
UCH71	100	-1...-20	33	50	1,9	2,6	220	2	0,7	19	4,9
UCH81	200	-2,6...-33	18	123	4,3	7,6	220	2,4	0,6	20	9,7
UCH81	170	-2,2...-28	18	102	3,8	6,2	220	2,3	0,6	20	8,8
UCH81	100	-1,2...-17	18	60	2,2	3,4	220	2	0,5	20	5,8

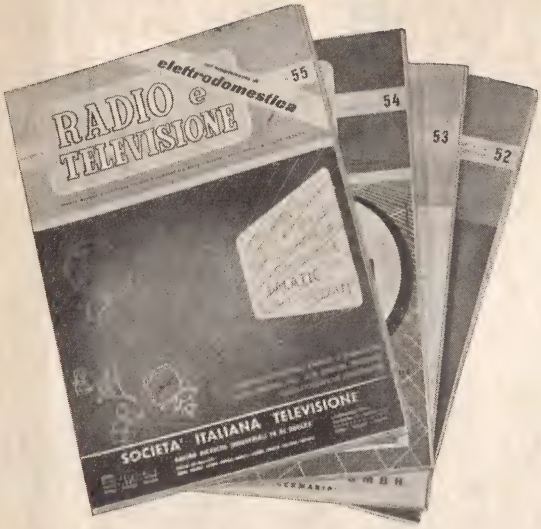


ECH4 ECH21 ECH71

		Vb: 250V					
Ra	k	47		100		220	
Vg	**V**	**−2**	**−4**	**−2**	**−4**	**−2**	**−4**
Ia	mA	3,5	3	2	1,7	1	0,9
Vo	Veff	7,5	7,5	7,5	7,5	7,5	7,5
A	—	14	13	14	13	13	12
d	%	2,1	1,5	2,1	1,6	2,5	2

UCH4 UCH21 UCH71

		Vb: 100V			Vb: 200V		
Ra	k	47	100	220	47	100	220
Vg	**V**	**−1**	**−1**	**−1**	**−2**	**−2**	**−2**
Ia	mA	1,3	0,68	0,37	2,8	1,5	0,8
Vo	Veff	7,5	7,5	7,5	7,5	7,5	7,5
A	—	11	10,5	10	11	10,5	10
d	%	5,4	5,8	6	2,2	2,8	2,8



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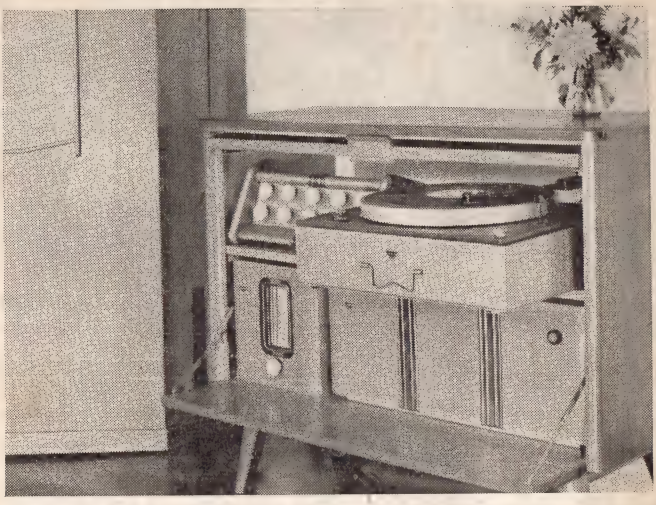

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MEETVERSTERKER. Bestelnr. 1004	„ 0,75
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BANDRECORDING IN DE PRACTIJK Bestelnr. 707 (2e herziene druk)	„ 1,25
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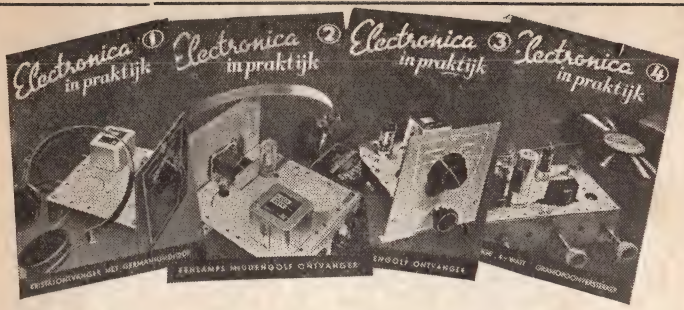
MK. BUIZENHANDBOEK. Bestelnr. 760	„ 7,50

BIJ DE RADIOHANDEL VERKRIJGBAAR



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L'électronique pratique
Deine Radiopraxis

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✶

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DEEL 1 Volledige bouwbeschrijving met bouwtekeningen van een kristalontvanger met germaniumdiode. Bestelnr. 711

DEEL 2 Volledige bouwbeschrijving met bouwtekeningen van een éénlamps batterijontvanger. Bestelnr. 712

DEEL 3 Volledige bouwbeschrijving met bouwtekeningen van een 2-lamps batterijontvanger. Bestelnr. 713

DEEL 4 Volledige bouwbeschrijving met bouwtekeningen van een eenvoudige en goedkope 4 watt versterker. Bestelnr. 714

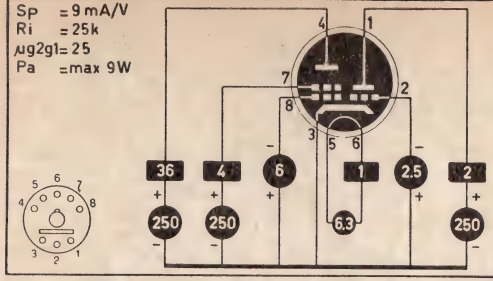
DEEL 5 Volledige bouwbeschrijving met bouwtekeningen van een 1-lamps wisselstroom-ontvanger. Bestelnr 715

Cette collection existe en langue française
Diese Reihe ist in Deutsche Sprache vorhanden.

BIJ DE RADIOHANDEL IN VOORRAAD

ECL11

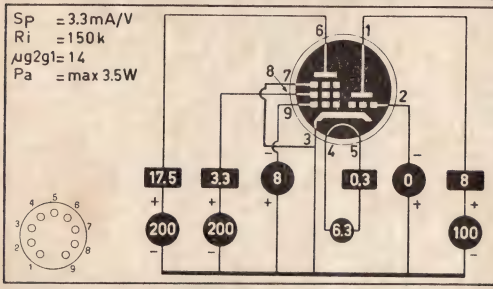
Sp = 9 mA/V
Ri = 25k
μg2g1 = 25
Pa = max 9W



S_T = 2mA/V
Ri = 35k
Pa = max 0.5 W

ECL80

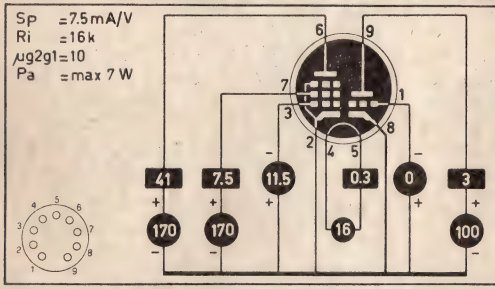
Sp = 3.3 mA/V
Ri = 150k
μg2g1 = 14
Pa = max 3.5W



S_T = 1.9 mA/V
Ri = 11k
μ = 20
Pa = max 1W

PCL82

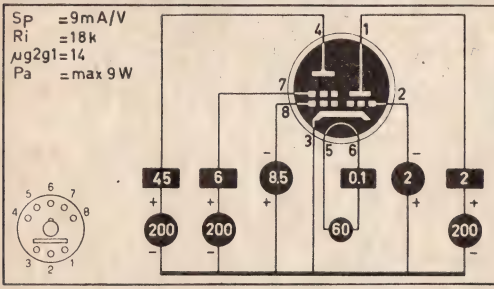
Sp = 7.5 mA/V
Ri = 16k
μg2g1 = 10
Pa = max 7 W



S_T = 2.2 mA/V
Ri = 32k
μ = 70
Pa = max 1W

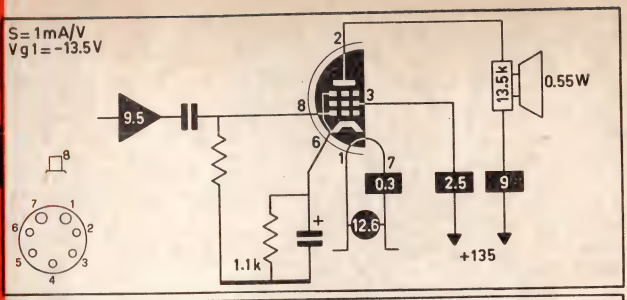
UCL11

Sp = 9 mA/V
Ri = 18k
μg2g1 = 14
Pa = max 9 W

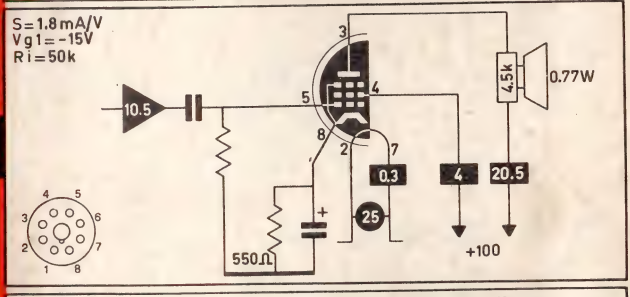


S_T = 2.1 mA/V
Ri = 30k
μ = 65
Pa = max 0.6 W

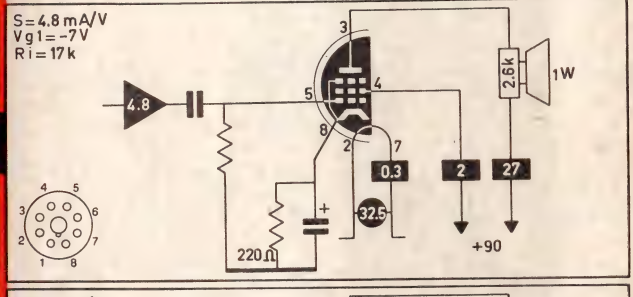
12A7



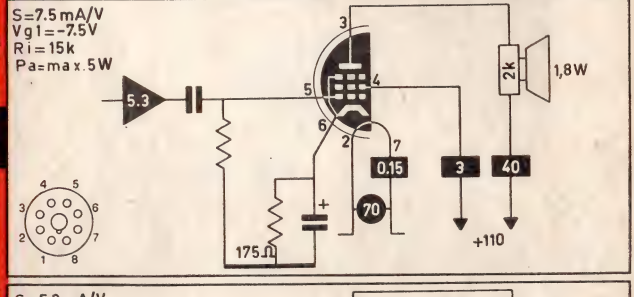
25A7



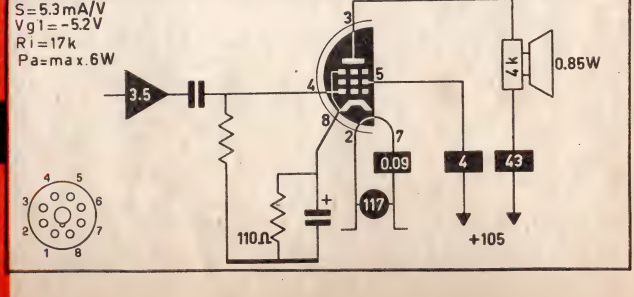
32L7

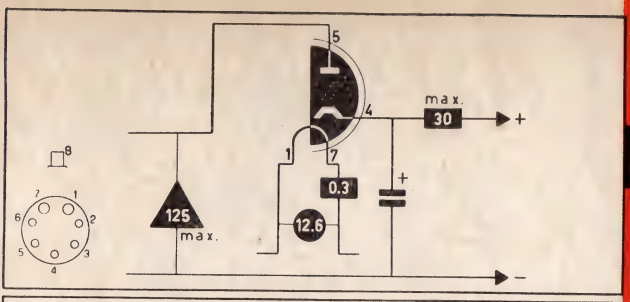


70L7

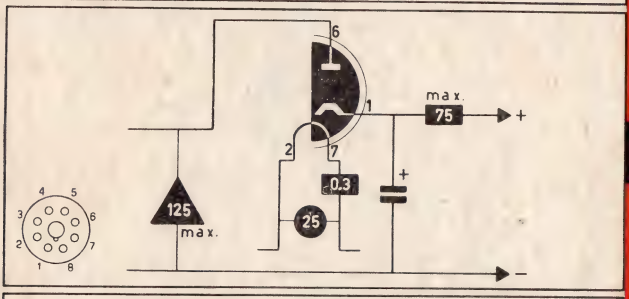


117L/M7

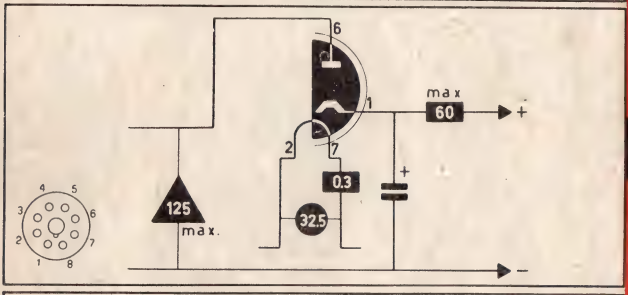




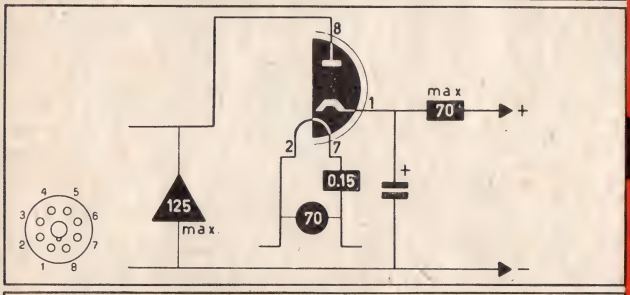
12A7



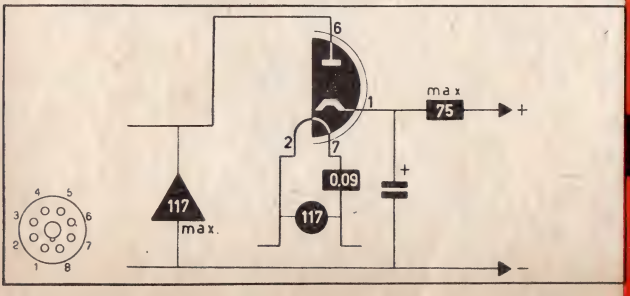
25A7



32L7



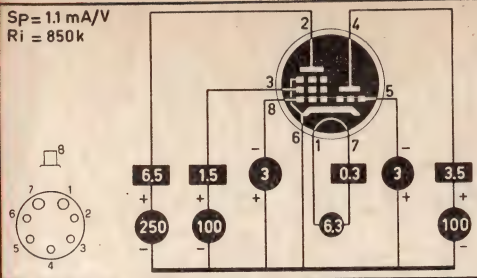
70L7



117L/M7

6F7

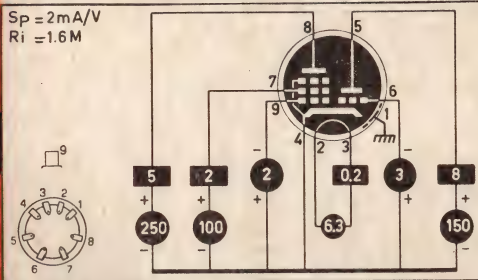
Sp = 1.1 mA/V
Ri = 850 k



S_T = 0.53 mA/V
Ri = 20 k

ECF1

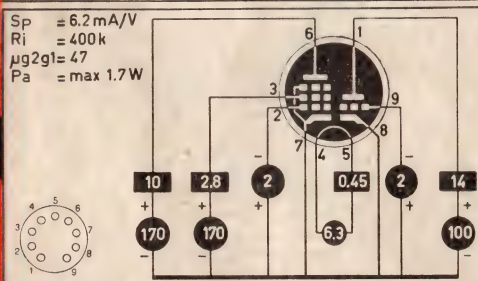
Sp = 2 mA/V
Ri = 1.6 M



S_T = 2.2 mA/V
Ri = 9 k
μ = 20

ECF80

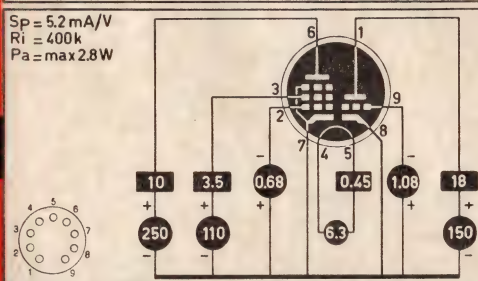
Sp = 6.2 mA/V
Ri = 400 k
$\mu g2g1$ = 47
Pa = max 1.7 W



S_T = 5 mA/V
Ri = 4 k
μ = 20
Pa = max 1.5 W

ECF82

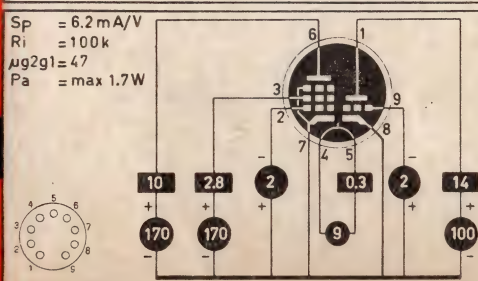
Sp = 5.2 mA/V
Ri = 400 k
Pa = max 2.8 W



S_T = 8.5 mA/V
Ri = 5 k
μ = 40
Pa = max 2.5 W

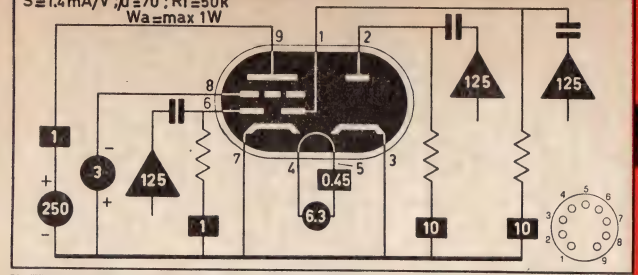
PCF80

Sp = 6.2 mA/V
Ri = 100 k
$\mu g2g1$ = 47
Pa = max 1.7 W

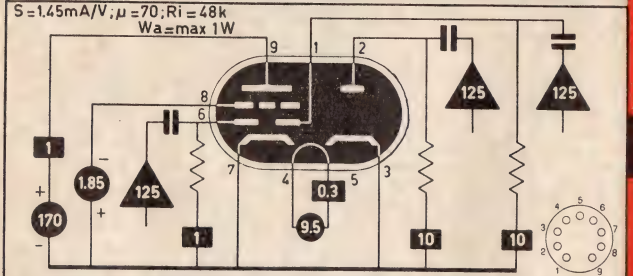


S_T = 5 mA/V
Ri = 4 k
μ = 20
Pa = max 1.5 W

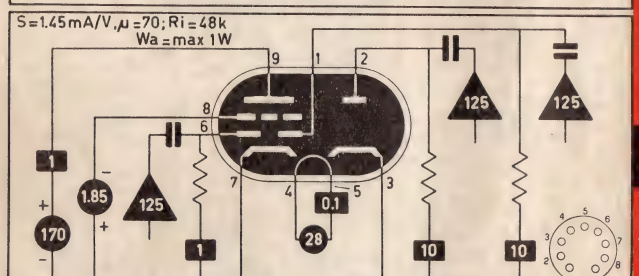
S=1.4mA/V ;μ=70 ; Ri=50k
Wa=max 1W



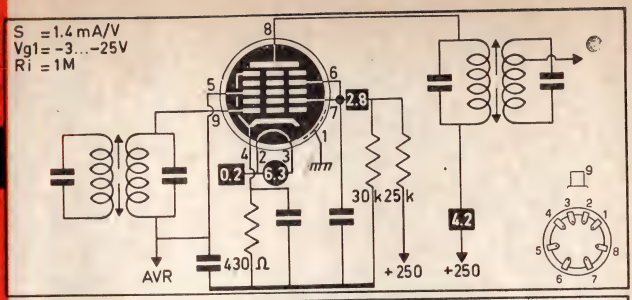
S=1.45mA/V ;μ=70 ; Ri=48k
Wa=max 1W



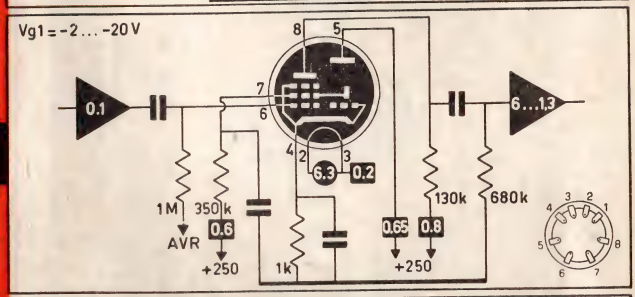
S=1.45mA/V ,μ=70 ; Ri=48k
Wa=max 1W



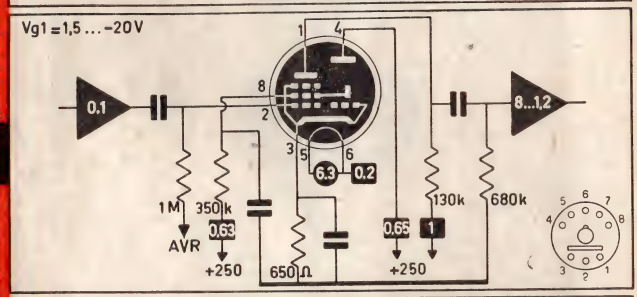
EH2



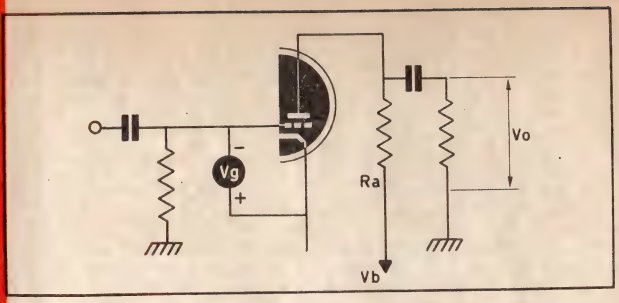
EFM1



EFM11



	=		
6AB8	ECL80	-	-
ECL80	6AB8	-	-
6U8	ECF82	-	-
9U8	PCF82	-	-
ECF82	6U8	-	-
PCF82	9U8	-	-
6AK8	EABC80	-	-
EABC80	6AK8	-	-
PABC80	-	UABC80	-
UABC80	-	PABC80	-



		Vb : 200V			Vb : 250V		
Ra	k	47	100	220	47	100	220
R'g1	k	150	330	680	150	330	680
Vg	V	-4,2	-4,2	-4,2	-5,5	-5,5	-5,5
Ia	mA	2,2	1,2	0,6	2,8	1,5	0,75
Vo max	Veff	27	29	30	36	39	40
A	—	9,5	10	11	9,5	10	11
d	%	9	8	6,5	9,2	8,3	7

		Vb : 100V			Vb : 170V		
Ra	k	47	100	220	47	100	220
R'g1	k	150	330	680	150	330	680
Ia	mA	0,52	0,35	0,21	1,25	0,82	0,46
Vo	Veff	5	5	5	8	8	8
A	—	26	35	44	32	42	51
d	%	4,3	2,3	1,7	2	1,3	1,1
		Vb : 200V			Vb : 250V		
Ra	k	47	100	220	47	100	220
R'g1	k	150	330	680	150	330	680
Ia	mA	1,6	1	0,56	2,2	1,4	0,76
Vo	Veff	8	8	8	8	8	8
A	—	34	44	53	36	47	54
d	%	1,5	1	0,9	1	0,8	0,6
		Rg1 : 10M					

NOTITIES:

RPB SERIE

Die U-Röhren-Reihe und ihre Schaltungen
Bestelnr. RP1 Prijs *f* 1,50
Rimlock- und Pico-Röhren und ihre Schaltungen. Bestelnr. RP2 Prijs *f* 1,50
UKW-FM-Rundfunk in Theorie und Praxis
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UKW-Empfang mit Zusatzgeräten
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Bestelnr. RP6 Prijs *f* 1,50
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Bestelnr. RP9 Prijs *f* 1,50
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Bestelnr. RP11 Prijs *f* 1,50
Röhrenmessgeräte in Entwurf und Aufbau
Bestelnr. RP12 Prijs *f* 1,50
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Bestelnr. RP13 Prijs *f* 1,50
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Bestelnr. RP14 Prijs *f* 1,50
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Bestelnr. RP15 Prijs *f* 1,50
Widerstandkunde für Radiopraktiker, deel I
Bestelnr. RP16 Prijs *f* 1,50
Prüfsender für UKW-Empfänger (UKW-Messgeräte) (Deel 2 is bestelnr. RP36.)
Bestelnr. RP17. Deel I Prijs *f* 1,50
Radio-Röhren (Wie sie wurden und was sie leisten) Bestelnr. RP18/19 Prijs *f* 3,—
Methodische Fehlersuche in Rundfunkempfängern. Bestelnr. RP20 Prijs *f* 1,50
Funktechniker lernen Formelrechnen, deel I (Deel 2 is bestelnr. RP42.)
Bestelnr. RP21 Prijs *f* 1,50
Lehrgang Radiotechnik, deel I
Bestelnr. RP22/23 Prijs *f* 3,—
Lehrgang Radiotechnik, deel II
Bestelnr. RP24/25 Prijs *f* 3,—
Tonstudio-Praxis
Bestelnr. RP26 Prijs *f* 1,50
Rundfunkempfang ohne Röhren (Vom Detektor zum Transistor)
Bestelnr. RP27/27a Prijs *f* 3,—
Die Glimmröhren und ihre Schaltungen
Bestelnr. RP28 Prijs *f* 1,50
Kleines ABC der Elektroakustik
Bestelnr. RP29/30 Prijs *f* 3,—
Sender-Baubuch für Kurzwellen-Amateure
Bestelnr. RP31/32 Prijs *f* 3,—
Röhrenvoltmeter
Bestelnr. RP33 Prijs *f* 1,50
Einzelteilprüfung
Bestelnr. RP34 Prijs *f* 1,50

VERKRIJGBAAR BIJ
DE RADIOHANDEL

OF RECHTSTREEKS BIJ

U.M. DE MUIDERKRING - BUSSUM

Wegbereiter der Funktechnik
Bestelnr. RP35 Prijs ƒ 1,50
Die Prüfung der Zwischenfrequenz-Verstärker und Diskriminator, deel II
Bestelnr. RP36 Prijs ƒ 1,50
Fehlersuche durch Signalverfolgung und Signalzuführung
Bestelnr. 37/38 Prijs ƒ 3,—
Die fernsenröhren und ihre schaltungen
Bestelnr. RP39/40 Prijs ƒ 3,—
Kurzwellenempfänger für Amateure
Bestelnr. RP41 Prijs ƒ 1,50
Funktechniker lernen Formelrechnen
(Deel 1 is bestelnr. RP21.)
Bestelnr. RP42. Deel II Prijs ƒ 1,50
Musikübertragungsanlagen
Bestelnr. RP43 Prijs ƒ 1,50
Kurzwellen-Antennen für Sendung und Empfang. Bestelnr. RP44 Prijs ƒ 1,50
UKW Sender- und Empfänger-Baubuch
Bestelnr. RP45/46 Prijs ƒ 3,—
Moderne Reise-Empfänger
Bestelnr. RP47 Prijs ƒ 1,50
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Bestelnr. RP48 Prijs ƒ 1,50
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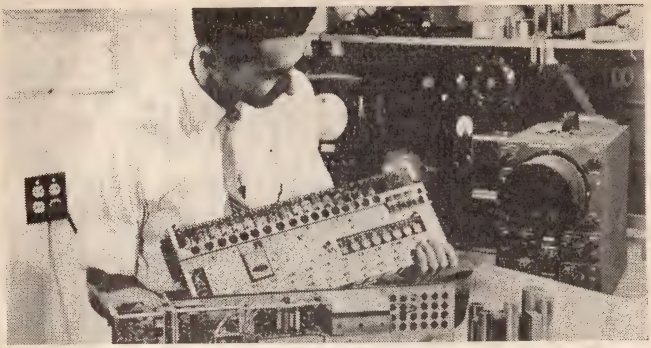
Bestelnr. RP49 Prijs ƒ 1,50
Praktischer Antennenbau
Bestelnr. RP50 Prijs ƒ 1,50
Fernsen-Bild fehler-Fibel
Bestelnr. RP51 Prijs ƒ 1,50
Kleine Fernsehempfangs Praxis
Bestelnr. RP52/54 Prijs ƒ 4,50
Fernsentechnik von A Bis Z
Bestelnr. 55/56 Prijs ƒ 3,—
Tönende Schrift
Bestelnr. RP57 Prijs ƒ 1,50
Morse-Lehrgang
Bestelnr. RP58 Prijs ƒ 1,50
Funk-Entstörungs-Praxis
Bestelnr. RP59 Prijs ƒ 1,50
Die Widerstand-Kondensator-Schaltung
Bestelnr. RP60 Prijs ƒ 1,50
Nomogramme als Hilfsmittel für den Funktechniker. Bestelnr. RP61 Prijs ƒ 1,50
Moderne Schallplattentechnik
Bestelnr. 63/65 Prijs ƒ 4,50
Englisch für Radiopraktiker
Bestelnr. 62 Prijs ƒ 1,50
Schwebongssummer
Bestelnr. 78 Prijs ƒ 1,50
Bastelpraxis
Bestelnr. 79 Prijs ƒ 1,50
Das Spulenboch
Bestelnr. 80/80a Prijs ƒ 3,—
Elektrische Grundlagen der Radiotechnik
Bestelnr. 81/83 Prijs ƒ 4,50
Sender Baubuch, deel II
Bestelnr. 66/67 Prijs ƒ 3,—
Formelsammlung für den Radio-Praktiker
Bestelnr. 68/70 Prijs ƒ 4,50
Bastel Praxis. Deel I
Bestelnr. 71 Prijs ƒ 1,50
Drahtlose Fernsteuerung von Flugmodellen
Einkreis-Empfänger
Bestelnr. RP72/73 Prijs ƒ 3,—
Bestelnr. RP74 Prijs ƒ 1,50
So gleicht der Praktiker ab
Bestelnr. RP75 Prijs ƒ 1,50
Bastelpraxis II. Bestelnr. RP76 Prijs ƒ 1,50
Der Selbstbau von Messgeräten für die Funkwerkstatt. Bestelnr. RP77 Prijs ƒ 1,50



TELEVISIEUITGAVEN

Zo . . . werkt de Televisie
Bestelnr. 756 — Prijs f 4,95

Fernsehen ohne Geheimnisse
Bestelnr. 900 — Prijs f 6,65

Die Fernsehröhren und ihre Schaltungen
Bestelnr. RP39.40 — Prijs f 3,–

Fernseh-Bildfehler-Fibel
Bestelnr. RP51 — Prijs f 1,50

Kleine Fernsehempfangs-Praxis
Bestelnr. RP52/54 — Prijs f 4,50
In geheel linnen band f 6,35

Fernsehtechnik von A bis Z
Bestelnr. RP55/56 — Prijs f 3,–

Der Fernseh-Empfänger, door Dr R. Goldammer.
Bestelnr. 888 — Prijs f 11.80

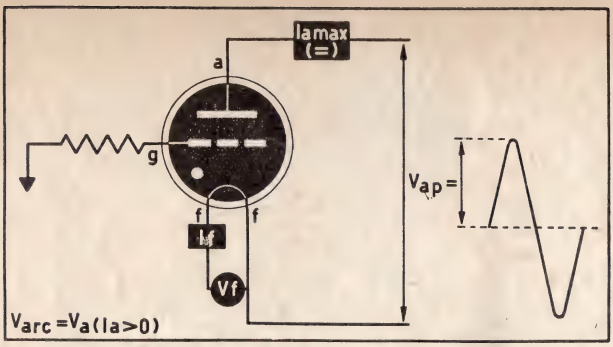
Aufbau und Arbeitsweise des Fernsehempfängers
door Dr Ing. W. Dillenburger.
Bestelnr. 886 — Prijs f 12,20

Fernseh-Experimentier-Praxis,
door Ing. H. Richter
Bestelnr. 836 — Prijs f 16,05

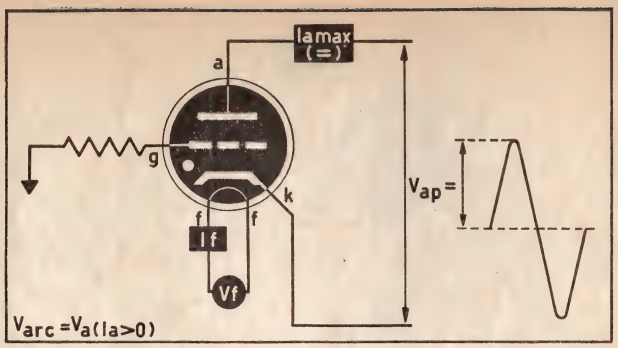
Fernsehen für Alle, door H. Richter
Bestelnr. 835 — Prijs f 11,05

U.M. DE MUIDERKRING-BUSSUM

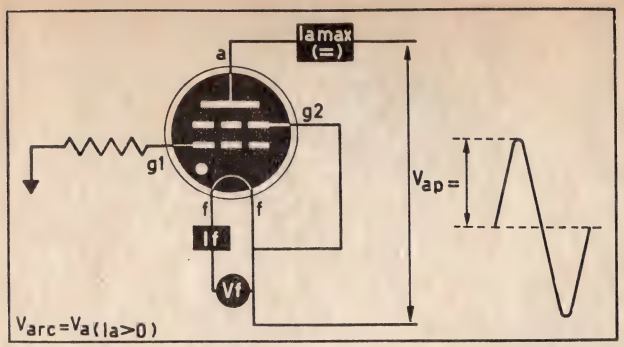
GIRO 83214 · TELEFOON 02959-5600



		Vf	If	Vap	Ia max.	Varc	
		V	A	V	A	V	
I.O.	1	2,5	2,5	200	0,02	15	2A4G
UX4	5	2,5	7	1000	1,5	15	3C23
UX4	5	2,5	5	2500	0,5	12	17
UX4	5	2,5	5	2500	0,5	12	PL17
UX4	5	2,5	5	2500	0,5	12	PL5557
-	-	1,4	0,05	45	0,0015	30	RK61
UX4	13	1,4	0,05	45	0,0015	15	RK62

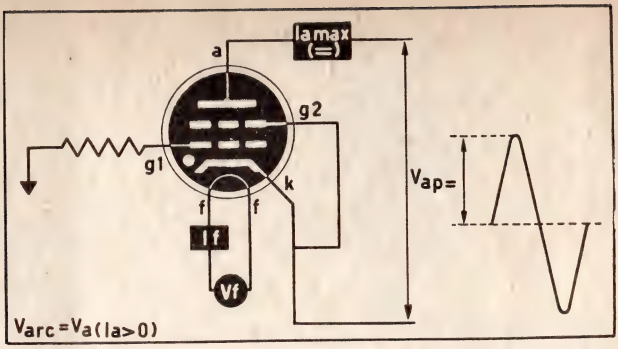


			Vf	If	Vap	Ia max.	Varc
			V	A	V	A	V
2B4	UX5	2	2,5	1,4	300	0,001	19
2C4	B7G	3	2,5	0,65	350	0,005	16
6D4	B7G	6	6,3	0,25	350	0,025	16
6Q5G	I.O.	7	6,3	0,6	300	0,001	19
884	I.O.	7	6,3	0,6	350	0,075	-
885	UX5	2	2,5	1,4	350	0,075	-
2523N1/ 128AS	UX5	2	2,5	1,75	400	0,001	13
4690	P	9	4	1,3	500	0,075	50
EC50	P	9	6,3	1,3	1000	0,04	33
PL57	UX4	11	5	4,5	1000	2,5	12
PL5559	UX4	11	5	4,5	1000	2,5	12

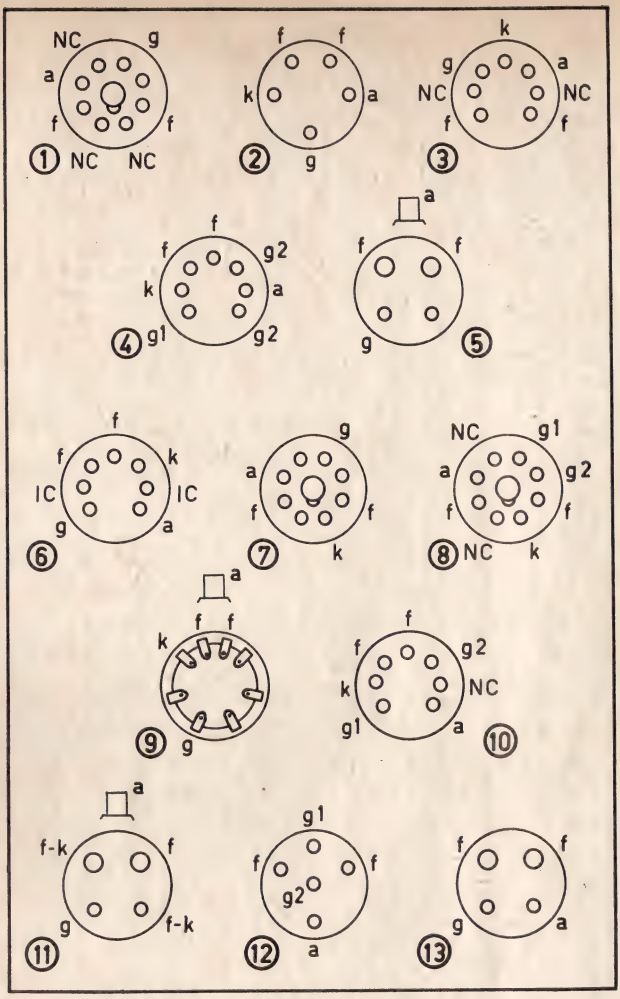


		Vf	If	Vap	Ia max.	Varc
		V	A	V	A	V
B5	12	2	2,6	650	0,5	15

PL1607



			Vf	If	Vap	Ia max.	Varc
			V	A	V	A	V
2D21	B7G	4	6,3	0,6	650	0,1	8
2050	I.O.	8	6,3	0,6	650	0,1	8
2051	I.O.	8	6,3	0,6	350	0,075	14
5663	B7G	10	6,3	0,15	250	0,02	-
5696	B7G	4	6,3	0,15	250	0,025	-
5727	B7G	4	6,3	0,6	650	0,1	8
PL21	B7G	4	6,3	0,6	650	0,1	8


NC
g
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f
① NC NC
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k
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③
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g1
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⑤
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IC
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⑪
g1
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g2
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⑫
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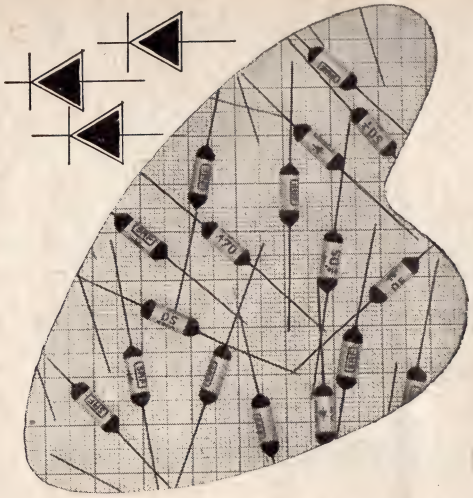
f
g
a
⑬

2B4	-	6Q5G	6Q5G
2D21	PL21	-	-
4G/280K	PL21	-	-
6Q5G	-	2B4	2B4
17	PL17	-	-
20A2	PL21	-	-
272	PL17	-	-
884	-	885	885
885	-	884	884
967	PL17	-	-
1257	PL57	-	-
2050	-	-	PL21
4261	PL17	-	-
5557	PL17	-	-
5559	PL57	-	-
5727	PL21	-	-
38217	PL17	-	-
CE309	PL17	-	-
CT1/500	PL17	-	-
CV1144	PL17	-	-
EE17	PL17	-	-
ELC3J/A	PL57	-	-
FG17	PL17	-	-
FG57	PL57	-	-
FG95	PL57	-	-
GL5557	PL17	-	-
GL5559	PL57	-	-
GL5560	PL57	-	-
MT17	PL17	-	-
MT57	PL57	-	-
NL715	PL17	-	-
NGT5	PL17	-	-

O517	PL17	-	-
PL2D21	PL21	-	-
PL17	17	-	-
PL17	272	-	-
PL17	967	-	-
PL17	4261	-	-
PL17	5557	-	-
PL17	38217	-	-
PL17	CE309	-	-
PL17	CT1/500	-	-
PL17	CV1144	-	-
PL17	EE17	-	-
PL17	FG17	-	-
PL17	GL5557	-	-
PL17	MT17	-	-
PL17	NL715	-	-
PL17	NGT5	-	-
PL17	O517	-	-
PL17	PL5557	-	-
PL17	RCA5557	-	-
PL17	TT17	-	-
PL17	UE967	-	-
PL17	WE17	-	-
PL17	WL17	-	-
PL17	WL5557	-	-
PL21	2D21	-	-
PL21	4G/280K	-	-
PL21	20A2	-	-
PL21	5727	-	-
PL57	1257	-	-
PL57	5559	-	-
PL57	ELC3J/A	-	-

	=		
PL57	FG57	-	-
PL57	FG95	-	-
PL57	GL5559	-	-
PL57	GL5560	-	-
PL57	MT57	-	-
PL57	PL5559	-	-
PL57	RCA5559	-	-
PL57	WE57	-	-
PL57	WL57	-	-
PL57	WL631	-	-
PL5557	PL17	-	-
PL5559	PL57	-	-
RCA2050	-	-	PL21
RCA5557	PL17	-	-
RCA5559	PL57	-	-
TT17	PL17	-	-
UE967	PL17	-	-
WE17	PL17	-	-
WE57	PL57	-	-
WL17	PL17	-	-
WL57	PL57	-	-
WL631	PL57	-	-
WL5557	PL17	-	-



S·A·F

KRISTALL-DIODEN

SÜDDEUTSCHE APPARATE-FABRIK
Abteilung der Standard Elektrizitäts-Gesellschaft AG.
NÜRNBERG

Nederlandsche Standard Electric Mij. N.V.

's-Gravenhage

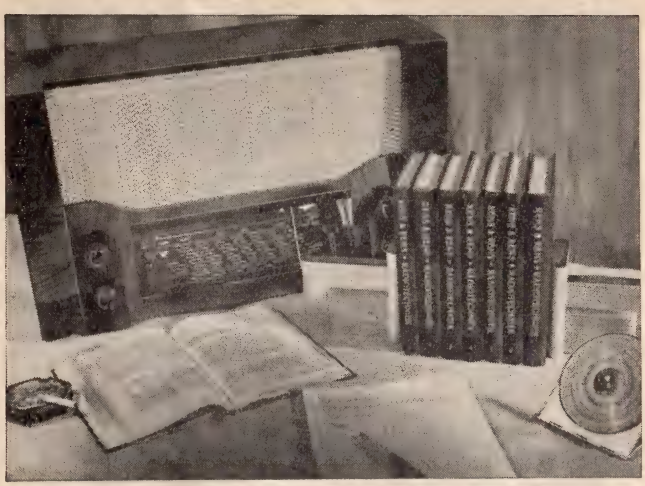
INTERNATIONAL TELEPHONE & TELEGRAPH SYSTEM

Alleenvertegenwoordiging in Nederland van:

International Standard Electric Corp, New York
Standard Telephones & Cables Ltd. London
(Brimar Radio Receiver Valve Division, Footscray)
C. Lorenz Aktiengesellschaft, Stuttgart
Süddeutsche Apparate Fabrik, Nürnberg

Standard

Transmitting, amplifying and receiving valves
Trustworthy, CV, JAN and commercial types
Germanium Diodes, Transistors, Thermistors



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IN ZEVEN DELEN — CIRCA 3000 Blz.

samengesteld door RENS & RENS,
Directeuren der Middelbare Technische School voor Radiotechniek te Hilversum

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deel III	- Ontvangers en versterkers ..	Prijs *f*36,—
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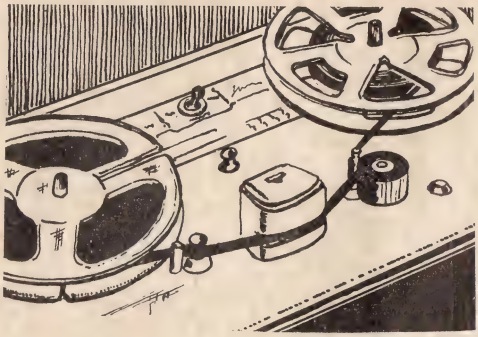

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GIRO 83214 TEL. 5600

Type	1N34	1N34A	1N38	1N38A	1N43	1N44	1N45	1N46	1N47	1N48	1N50	1N51	1N52	1N54
Description	g.p. diode	g.p. diode	100 V diode	100 V diode	g.p. diode	g.p. diode	g.p. diode	g.p. diode	g.p. diode	g.p. diode	h.inv. resist.	g.p. diode	g.p. diode	h.inv. resist.
Replacement type	OA85	OA85	OA85	OA85	OA85	OA85	OA85	OA85	OA85	OA85	OA85	OA81	OA85	OA85
Turnover voltage	75	75	120	120	90	150	110	80	140	85		50	85	75
Max. peak inv. voltage	60	60	100	100	60	115	75	60	115	70				35
Max. d.c. inv. voltage														
Max. mean forw. current	50	50	50	50	40	40	40	40	30	50	50	25	50	50
Max. peak forw. current	150	150	150	150	125	150	100	125	90	150	50	100	150	150
Fault current	500	500	500	500	500	400	400	500	350	400	400	300	400	500
Forw. current at +1V	5	5	3	4	5	3	3	3	3	4	4	2.5	4	5
+2V														
+3V														
Rev. current at -3V			6	5					4					
-5V					20									
-10V	50	30								50				10
-20V											80			
-40V														
-50V	800	500	625	500	900	410	410		410	833		1660	150	
-60V														
-75V														
-80V														
-90V														
-100V														
-120V														
-125V														
-150V														
-200V														
Max. ambient temp.	70	70	70	70								70	70	70

Type	1N54A	1N57	1N58	1N58A	1N61	1N62	1N65	1N66	1N68	1N68A	1N69	1N70	1N75	1N81
Description	h.inv. resist.	80 V diode	100 V diode	100 V diode	125 V diode	g.p. diode	g.p. diode	g.p. diode	100V d.c. restorer	h.inv. resist.	J.A.N. type	J.A.N. type	h.inv. resist.	J.A.N. type
Replacement type	OA85	OA85	OA85	OA85	OA85	OA85	OA81	OA85	OA85	OA85	OA85	OA85	OA81	OA85
Turnover voltage	75	90	120	120	140	120	85	70	120	130	75	125	125	50
Max. peak inv. voltage	50	80	100	100	130	110	70	60	100	100	60	100	100	40
Max. d.c. inv. voltage														
Max. mean forw. current	50	40	50	50	40	40	50	50	35		40	30	50	30
Max. peak forw. current	150	150	150	150	150	150	150	150	100		125	90	150	90
Fault current	500	500	500	500	500	500	400	500	500		400	350	400	350
Forw. current at +1V	5	4	4	4	5	5	2.5	5	3	3	5	3	2.5	3
+2V														
+3V														
Rev. current at. -3V														
-5V														
-10V	7							50			50	25		10
-20V														
-40V														
-50V	100						200	800			850	300		
-60V														
-75V		500												
-80V														
-90V														
-100V			800	600	300	700			625	625				
-120V														
-125V					700									
-150V														
-200V														
Max. ambient temp.	70	75	70		75		75	100 storage	100 storage		75	75	70	75

Type	1N86	1N88	1N89	1N90	1N111	1N112	1N113	1N114	1N115	1N116	1N126	1N127	1N128	1N135
Description	g.p. diode	g.p. diode	h.inv. resist.	J.A.N. type	comp. diode	comp. diode	comp. diode	comp. diode	comp. diode	500kΩ type	J.A.N. type	J.A.N. type	J.A.N. type	g.p. diode
Replacement type	OA85	OA81	OA85	OA85	OA85	OA85	OA81	OA81	OA81	OA85	OA85	OA85	OA85	OA85
Turnover voltage	85	100	100	75	70	70	70	70	70	75	75	125	50	75
Max. peak inv. voltage	70	85	80	60						60	60	100	40	
Max. d.c. inv. voltage														
Max. mean forw. current	50	50									30	30	30	
Max. peak forw. current	150	150												
Fault current	400	500									350	350	300	
Forw. current at +1V	4	2.5	3.5	5	5	5	2.5	2.5	2.5	5	5	3	3	5
+2V														
+3V														
Rev. current at -3V														
-5V			8					-						
-10V	50			6	25	50	25	50	100		50	25	10	50
-20V														
-40V														
-50V	833	100	100	800	125	250	125	250	500	100	850	300		850
-60V														
-75V														
-80V														
-90V														
-100V														
-120V														
-125V														
-150V														
-200V														
Max. ambient temp.		75			70	70	70	70	70					70

Type	1N198	CK705	CK707	CK708	CK713A	DS159	DS160	DS161S	DS162	DS1601	DS1604	DS1606	GD1E	GD1Q	
Description	g.p. diode	g.p. diode	g.p. diode	100 V diode	comp. diode	g.p. diode	g.p. diode	g.p. diode	g.p. diode	g.p. diode	g.p. diode	h.inv. resist.	g.p. diode	g.p. diode	
Replacement type	OA85	OA85	OA85	OA85	OA85	OA85	OA85	OA85	OA85	OA85	OA81	OA85	OA85	OA85	
Turnover voltage	50	70	100	120	85								55	55	V
Max.peak inv.voltage		60	80	100	70	20	40	80	120	40	20	20	40	40	V
Max.d.c. inv.voltage															V
Max.mean forw. current		50	35	55	50								40	40	mA
Max.peak forw. current		150	100	100	150	300	300	300	300	300	300	300			mA
Fault current		500	500	500	550								300	200	mA
Forw. current at +1 V	5	5	3,5	3		10	5	3	3	3	1,5	3	5	5	mA
+2 V					21										mA
+3 V															mA
Rev. current at -3 V															µA
-5 V			10												µA
-10 V	75	50				75	100	10	10	100	400	200	11	20	µA
-20 V															µA
-40 V					250										µA
-50 V	250	800	100												µA
-60 V															µA
-75 V															µA
-80 V															µA
-90 V															µA
-100 V				625											µA
-120 V															µA
-125 V															µA
-150 V															µA
-200 V															µA
Max. ambient temp.	90	100 storage	100 storage	100 storage	100 storage	70	70	70	70	70	70	70	70	70	°C

Type	GD2E	GD2Q	GD3E	GD4E	GEX45/1	GEX55/1	G26	HD2053	HD2057	HD2060	HD2063	M550	M550A
Description	g.p. diode	g.p. diode	100 V diode	g.p. diode	g.p. diode	g.p. diode	g.p. diode	h.inv. resist.	500kΩ type	500kΩ type	J.A.N. type	g.p. diode	g.p. diode
Replacement type	OA85	OA85	OA85	OA85	OA85	OA81	OA85	OA85	OA85	OA85	OA85	OA85	OA85
Turnover voltage	100	55	115	55	75	75		130	100	75	125		
Max. peak inv. voltage	80	40	100	40				100	80	60	100	55	60
Max. d.c. inv. voltage							80						
Max. mean forw. current	40	40	40	40	50	50	40				30		
Max. peak forw. current					100	100					90		
Fault current	300	200	300	300	500	500					350		
Forw. current at +1V	4	5	3	3	5	1	4	3	3.5	5	3	5	5
+2V													
+3V													
Rev. current at -3V													
-5V							5		8				
-10V	20	11	10	35			50				25	50	30
-20V													
-40V													
-50V					800	200			100	100	300	800	500
-60V													
-75V													
-80V													
-90V													
-100V								625					
-120V													
-125V													
-150V													
-200V													
Max. ambient temp.	70	70	70	70						75	75		

Type	M550B	M3100	NU34	NU38	NU58	OA71	OA74	OA150	OA161	RL31	RL32	RL43	RL143	
Description	g.p. diode	g.p. diode	comp. diode	100 V diode	100 V diode	g.p. diode	g.p. diode	g.p. diode	h.inv. resist.	g.p. diode	g.p. diode	g.p. diode	g.p. diode	
Replacement type	OA85	OA85	OA85	OA85	OA85	OA85	OA85	OA85	OA81	OA81	OA81	OA81	OA81	
Turnover voltage			75	120	120	120	80						110	V
Max. peak inv. voltage	70	110	60	100	100	90	60	70	120	45	45	90	80	V
Max. d.c. inv. voltage						60	40	55	100	40	40	80		V
Max. mean forw. current						35	35	20	20	50	50	50	50	mA
Max. peak forw. current						150	150	75	75	100	100	150		mA
Fault current						200	200	500	500	300	300	300	300	mA
Forw. current at +1V	5	3	5	3	4	3	4	4	2.5	2	2	2	2	mA
+2V														mA
+3V							25							mA
Rev. current at -3V				6										µA
-5V														µA
-10V	7	30	50			12	25	30		10	20	10	11	µA
-20V														µA
-40V							200			1000	1000			µA
-50V	100		800											µA
-60V						115	400	500	100					µA
-75V														µA
-80V												500		µA
-90V						250								µA
-100V		800		625	800				400					µA
-120V														µA
-125V														µA
-150V														µA
-200V														µA
Max. ambient temp.			75			60	60			70	70	70	70	°C

KRISTALDIODEN

description	beschrijving
g. p. (= general purpose)	voor algemeen gebruik
h. inv. resist.	hoge sperweerstand
replacement type	vervangingstype
turnover voltage	tegenspanning waarbij dynamische weerst. nul is
max. peak inv. voltage	max. topwaarde van de tegenspanning
max. d.c. inv. voltage	max. gelijkspanning in sperrichting
max. mean forw. current	max. gemiddelde stroom in doorlaatrichting
max. peak forw. current	max. topwaarde van stroom in doorlaatrichting
faultcurrent	foutstroom
forw. current at	stroom in doorlaatrichting bij ...
rev. current at	stroom in sperrichting bij ...
max. ambient temp.	max. omgevingstemperatuur

DIODA[2] KRISTAL

keterangan
pemakaian berupa-rupa
tahanan mengempang tinggi
matjam penggantian
tegangan penukar (tegangan-lawan pada mana tahanan dinamis mendjadi nol)
nilai „peak" maksimum dari tegangan-lawan
nilai maksimum dari tegangan-lawan searah
nilai rata[2] maksimum dari arus madju
nilai „peak" maksimum dari arus madju
arus salah
arus madju pada + ... V
arus lawan pada — ... V
temperatur sekitar maksimum

DIODES À CRISTAL

description
pour applications courantes
résistance élevée au courant inverse
type de remplacement
tension en opposition à laquelle la résistance dynamique est nulle
valeur maxima en crête de la tension en opposition
courant continu maximum dans le sens de blocage
courant moyen maximum dans le sens de passage
valeur maxima de crête de courant dans le sens de passage
courant transitoire initial
courant dans le sens de passage sous ...
courant dans le sens de blocage sous ...
température maxima d'ambiance

KRISTALLDIODEN

Beschreibung
zur allgemeinen Verwendung
hoher Sperrwiderstand
Ersatztyp

Gegenspannung bei Nullwert des dynamischen Widerstandes
maximale Gegenspannungs-Spitzenwert
maximale Gleichspannung in Sperrichtung
max. mittlerer Strom in Durchlaßrichtung
max. Strom-Spitzenwert in Durchlaßrichtung
Anlaßstromstoß
Strom in Durchlaßrichtung bei ...
Strom in Sperrichtung bei ...
max. Umgebungstemperatur

DIODOS DE CRISTAL
descripción
para empleo general
resistencia inversa elevada
tipo de sustitución
tensión en oposición a la cual la resistencia dinámica es cero
cresta de tensión inversa máxima
tensión continua inversa máxima
promedio de corriente máxima en sentido de paso
valor máximo de cresta de corriente en sentido de paso
corriente transitoria inicial
corriente en sentido de paso con ...
corriente inversa con ...
temperatura ambiente máxima

DIODOS DE CRISTAL
descrição
para uso geral
alta resistência inversa
tipo de sustituição
tensão em oposição à qual a resistência dinâmica é cero
crista de tensão inversa máxima
tensão contínua inversa máxima
corrente média máxima na direcção de passagem
valor máximo de crista de corrente na direcção de passagem
corrente transitória inicial
corrente na direcção da passagem com ...
corrente inversa com ...
temperatura ambiente máxima

DIODI A CRISTALLO
descrizione
per uso generale
alta tensione d'estinzione della traccia di ritorno
tipo di cambio
tensione in opposizione al punto con resistenza dinamica zero
massimo valore di picco della tensione in opposizione
massima tensione diretta in direzione di bloccaggio
massima corrente media in direzione di passaggio
massimo valore di picco in direzione di passaggio
colpo di corrente di messa in marcia
corrente in direzione di passaggio con ...
corrente in direzione di bloccaggio con ...
temperatura massima del ambiente

LIMITING VALUES	2N32	2N33	2N34	2N35	2N68	CK716	CK721	CK722	GSN1	
			PNP	NPN						
COLLECTOR VOLTAGE	-40	-8,5	-25	+25	-25	-15	-20	-20	-50	V
COLLECTOR CURRENT	-6	-7	-8	+8	-1500	-2,5	-5	-5	-10	mA
DISSIPATION	50	30	50	50	1500	-	30	30	250	mW
EMITTER CURRENT	+3	+0,8	+8	-8	-	+1	2	+5	8	mA
COLL. TO EM. V.	-	-	-	-	-	-	-	-	-	V
FREQUENCY	2,7	50	-	-	0,01	-	-	-	-	MHz
TEMPERATURE	+40	+40	+50	+50	-	-	+50	+50	+45	°C
INPUT RESISTANCE	400	-	-	-	-	-	650	325	200	Ω
OUTPUT RESISTANCE	31	-	40	40	-	-	20	20	10	kΩ
GAIN	21	-	-	-	10	-	38	34	18	dB
CURRENT AMPLIFIC.	2,2	-	-	-	-	1,2	0,98	0.9	-	α
OUTPUT POWER	-	-	-	-	3	-	-	-	-	W

LIMITING VALUES	GSN2	OC15	OC70	OC71	2OC72	OC601	OC602	TF71	VS200	
		PNP	PNP	PNP	PNP	PNP	PNP	NPN		
COLLECTOR VOLTAGE	-50	-	-	-	-	-50	-20	+50	-30	V
COLLECTOR CURRENT	-10	-1000	-10	-10	-110	-20	-20	+10	-8	mA
DISSIPATION	250	2000	6	6	-45	50	50	150	120	mW
EMITTER CURRENT	8	-	+10	+10	-45	+20	+20	-10	+6	mA
COLL. TO EM. V.	-	-6	-4,5	-4,5	-6,5	-	-	-	-	V
FREQUENCY	-	-	-	-	-	0,6	1,5	-	-	MHz
TEMPERATURE	+45	+45	+45	+45	+45	+45	+40	+50	+45	°C
INPUT RESISTANCE	200	-	2200	800	-	400	800	700	-	Ω
OUTPUT RESISTANCE	10	-	-	-	-	-	-	50	-	kΩ
GAIN	18	-	30	30	-	35	35	37	-	dB
CURRENT AMPLIFIC.	-	-	-	-	-	-	-	-	-	α
OUTPUT POWER	-	-	-	-	-	-	-	-	-	W

LIMITING VALUES	OC110	OC120	OC130	TJ1	TJ2	TJ3	TP1	TP2	
	PNP	PNP	PNP	PNP	PNP	PNP	-	-	
COLLECTOR VOLTAGE	-20	-20	-20	-1,5	-1,5	-1,5	-12	-20	V
COLLECTOR CURRENT	-10	-10	-10	0,2	0,2	0,2	1	2	mA
DISSIPATION	50	50	50	200	200	200	150	150	mW
EMITTER CURRENT	+1	+1	+1	-	-	-	1	1	mA
COLL. TO EM. V.	-	-	-	1,5	1,5	1,5	-	-	V
FREQUENCY	0,3	0,3	0,3	0,5	0,5	0,5	-	-	MHz
TEMPERATURE	+45	+45	+45	+20	+20	+20	+40	+40	°C
INPUT RESISTANCE	1500	2000	3000	-	-	-	250	250	Ω
OUTPUT RESISTANCE	-	-	-	-	-	-	25	25	kΩ
GAIN	30	32	35	27	27	27	-	-	dB
CURRENT AMPLIFIC.	-	-	-	-	-	-	-	-	α
OUTPUT POWER	-	-	-	-	-	-	-	-	W

TRANSISTOREN

limiting values	grenswaarden
collector voltage	collectorspanning
collector current	collectorstroom
dissipation	dissipatie
emitter current	emittor stroom
coll. to em. v.	spanning tussen collector en emittor
frequency	frequentie
temperature	temperatuur
input resistance	ingangsweerstand
output resistance	uitgangsweerstand
gain	energieversterking
current amplification	stroomversterkingsfactor (d)
output power	uitgangsenergie

TRANSISTORA[2]

nilai[2] batas
tegangan kolektor
arus kolektor
disipasi
arus emitter
tegangan kolektor-emitter
frekuénsi
temperatur
tahanan djalan masuk
tahanan djalan keluar
penguat tenaga
faktor penguat arus
tenaga djalan keluar

TRANSISTORS

valeurs limites
tension de collecteur
courant de collecteur
dissipation
courant d'émetteur
tension entre collecteur et émetteur
fréquence
température
résistance d'entrée
résistance de sortie
gain d'énergie
amplification de courant
puissance de sortie

TRANSISTOREN

Grenzwerte
Kollektorspannung
Kollektorstrom
Verlustleistung
Emitterstrom
Spannung zwischen Kollektor und Emitter
Frequenz

Temperatur
Eingangswiderstand
Ausgangswiderstand
Leistungsverstärkung
Stromverstärkung
Ausgangsleistung

TRANSISTORES

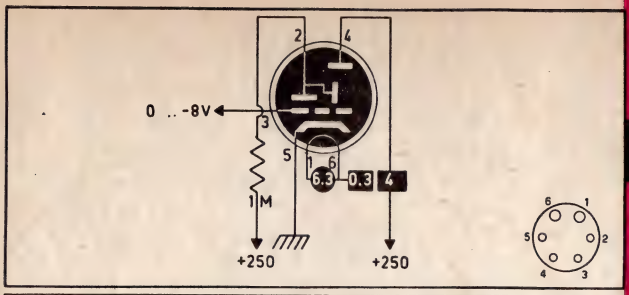
valores límites
tensión de colector
corriente de colector
disipación
corriente de emisor
tensión entre colector y emisor
frecuencia
temperatura
resistencia de entrada
resistencia de salida
ganancia de potencia
amplificación de corriente
energía de salida

TRANSISTORES

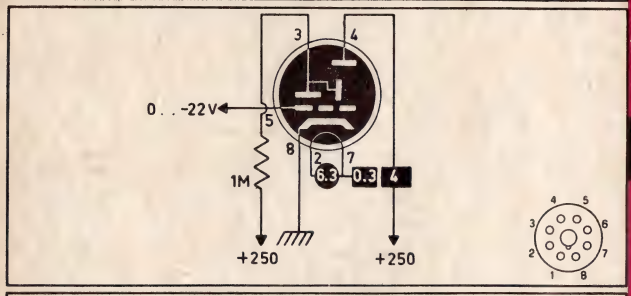
valores límites
tensão de colector
corrente de colector
dissipação
corrente de emissor
tensão entre colector e emissor
frequência
temperatura
resistência de entrada
resistência de saída
ganho de energia
amplificação de corrente
energia de saída

TRANSISTORI

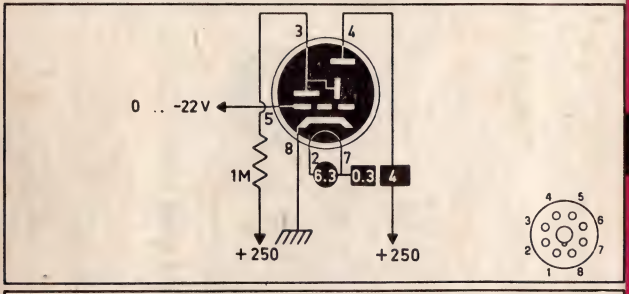
valori limiti
tensione del collettore
corrente del collettore
dissipazione
corrente dell'emissore
tensione tra il collettore e l'emissore
frequenza
temperatura
resistenza all'ingresso
resistenza all'uscita
guadagno di potenza
(fattore di) amplificazione di corrente
potenza in uscita



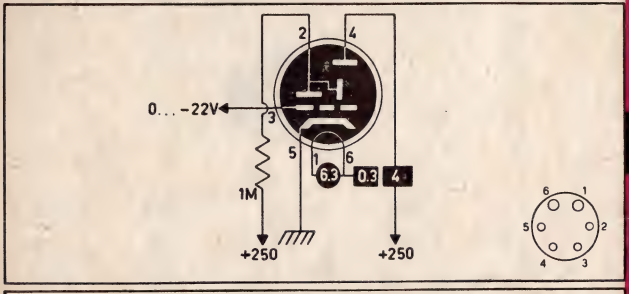
6E5



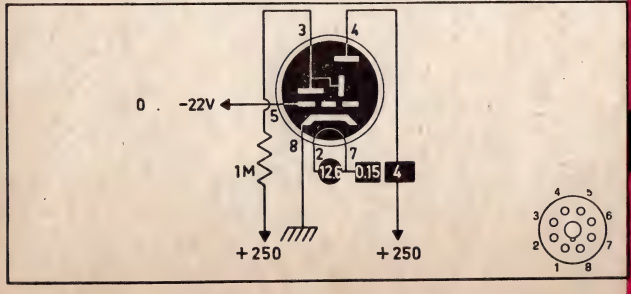
6G5G



6U5G

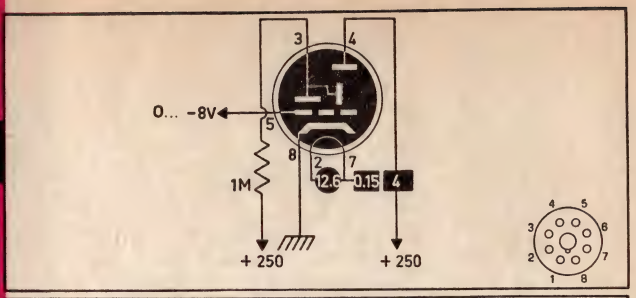


6U5/6G5

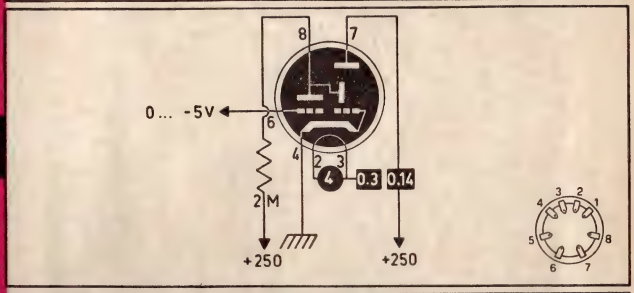


12U5G

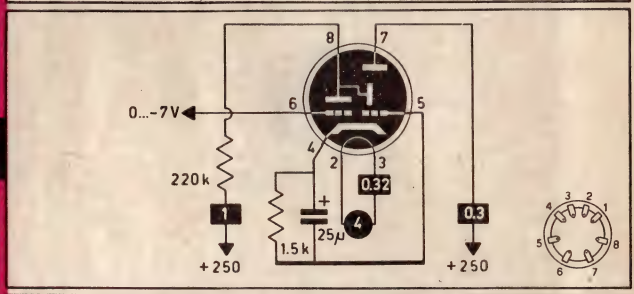
1629



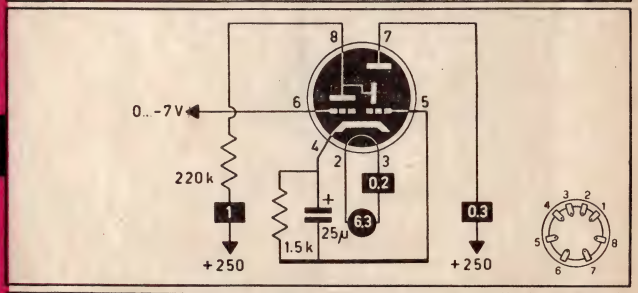
AM1



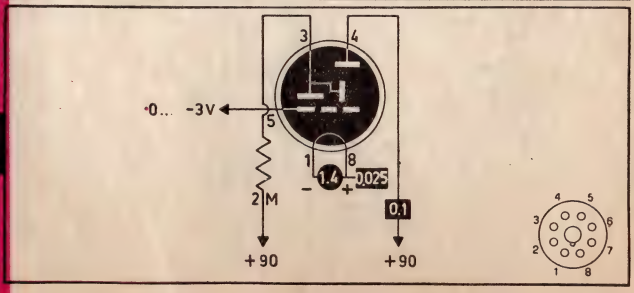
AM2

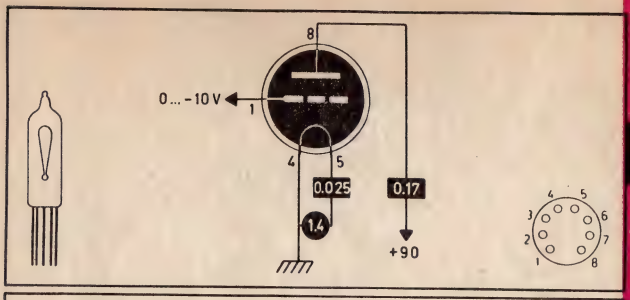


C/EM2

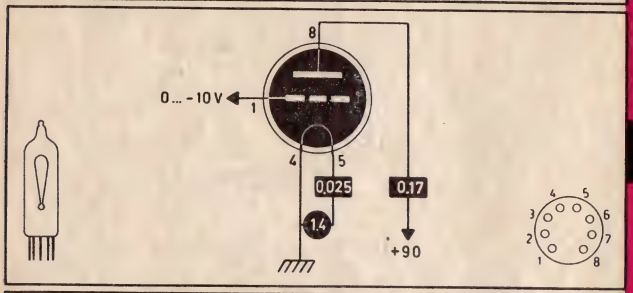


DM21

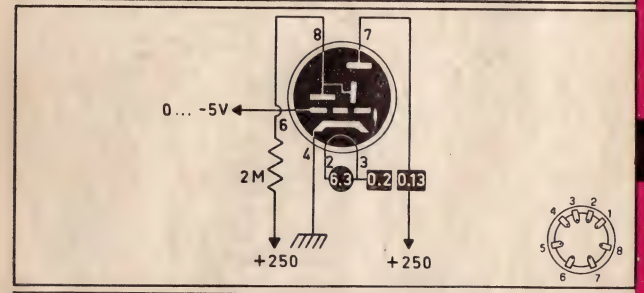




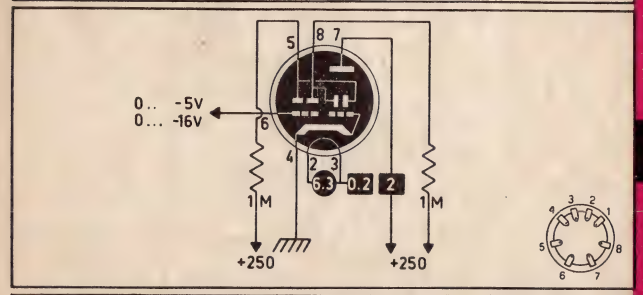
DM70



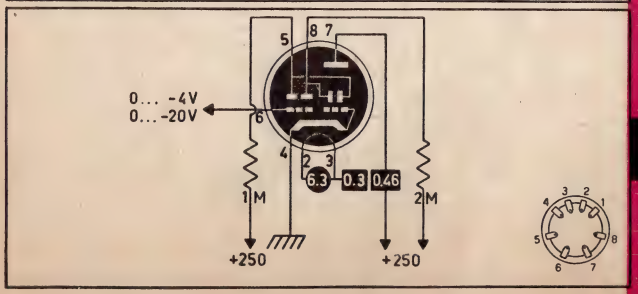
DM71



EM1

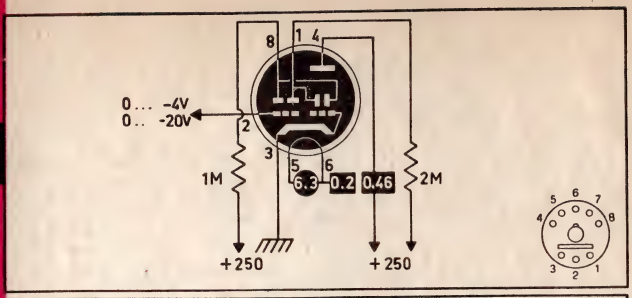


EM4

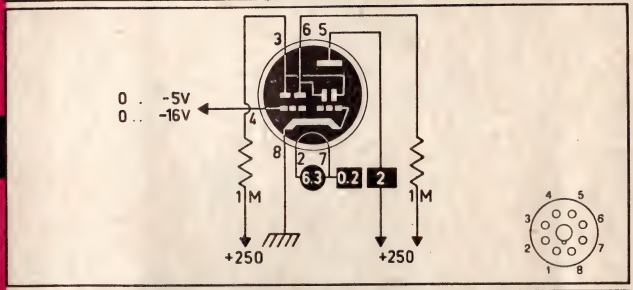


EM5

EM11



EM34



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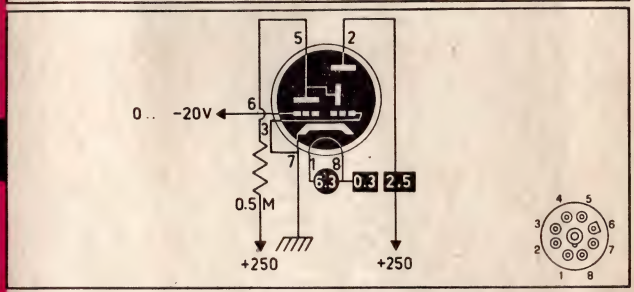
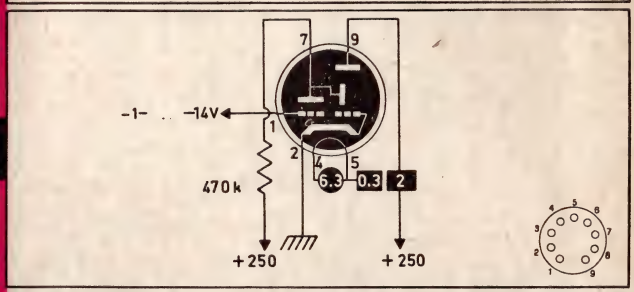
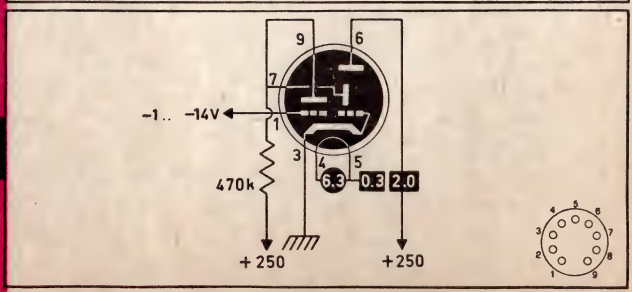
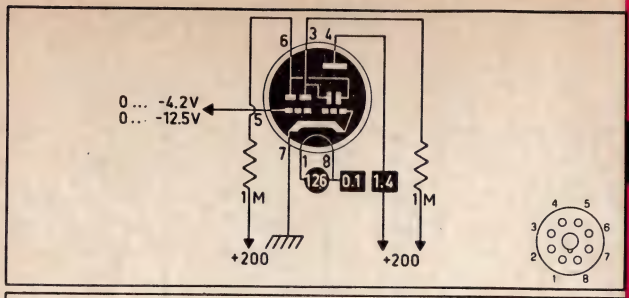


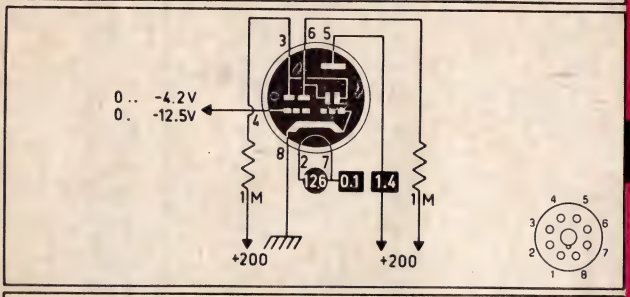
EM80

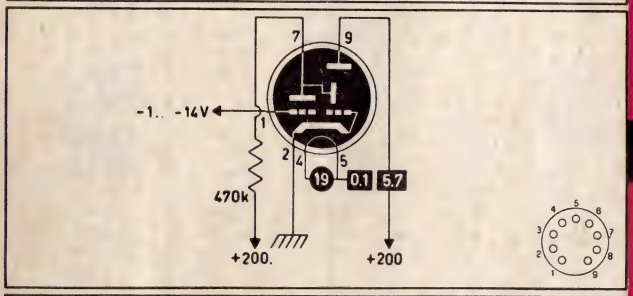


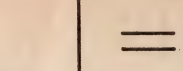
EM85

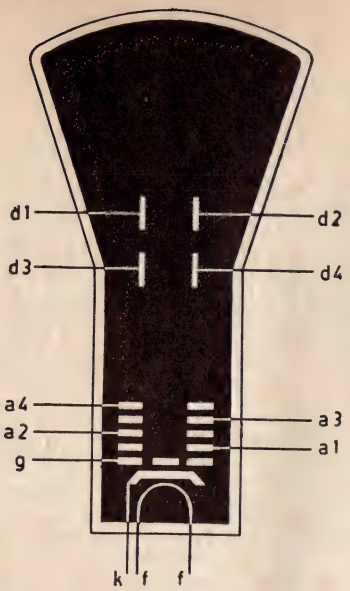



0 ... -4.2V
0 ... -12.5V
6
3 4
5
7
1 8
126
0.1
1.4
1 M
1 M
+200
+200
4 5
3 6
2 7
1 8


0 .. -4.2V
0 . -12.5V
3
6 5
4
8
2 7
126
0.1
1.4
1 M
1 M
+200
+200
4 5
3 6
2 7
1 8


-1.. -14V
7
9
1
2 4
5
19
0.1
5.7
470k
+200.
+200
4 5 6
3 7
2 8
1 9

			
6E5	-	1629	1629
6G5G	6U5G	12U5G	6U5/6G5
6U5G	6G5G	12U5G	6U5/6G5
12U5G	-	6U5G	-
1629	-	6E5	6E5
AM2	-	C/EM2	-
C/EM2	-	AM2	-
DM70	-	-	DM71
DM71	-	-	DM70
EM4	-	-	EM34
EM5	-	-	EM11
EM11	-	-	EM5
EM34	-	-	EM4
EM80	-	-	EM85
EM85	-	-	EM80
UM4	-	-	UM34
UM34	-	-	UM4



KATHODESTRAAL BUIZEN

diam.	schermdiameter
length	buislengte
CM	centimeter
base	voet
defl. angle degr.	afbuigingshoek in graden
defl. and foc. method	wijze van afbuiging en focussering
E	electrostatisch
M	(electro) magnetisch
color	kleur
green	groen
white	wit
blue	blauw
accelerator grid	versnellingselectrode
cutoff voltage	negatieve roosterspanning voor straalonderdrukking
defl. sens.	afbuigingsgevoeligheid

LAMPU[2] SINAR KATODA

diameter
ukuran pandjang
centimeter
kaki lampu
sudut defleksi (dalam deradjat)
tjara defleksi dan fokus
tjara defleksi elektrostatis
tjara defleksi maknit listrik
warna
hidjau

putih
biru
elektroda pertjepat
tegangan kisi negatif akan „blanking"
kepékaan defleksi

TUBES À RAYONS CATHODIQUES

diamètre de l'écran
longueur du tube
cent.mètres
culot
angle de déflexion
mode de déflexion et de focalisation
électrostatique
(électro)magnétique
couleur
vert
blanc
bleu
électrode d'accélération
polarisation négative de suppression
sensibilité de déflexion

KATHODENSTRAHLRÖHREN

Schirmdurchmesser
Röhrenlänge
Zentimeter
Sockel
Ablenkwinkel in Graden
Ablenk- und Fokussierungsmethode
elektrostatisch
elektromagnetisch
Farbe
grün
weiß
blau
Beschleunigungs-Elektrode
negative Gitterspannung (zur Unterdrückung des Elektronenstrahles)
Ablenkempfindlichkeit

TUBOS DE RAYOS CATODICOS

Diámetro de rejilla
Largo de tubo
centímetros
pie
ángulo de deflexión en grados
modo de deflexión y focalización
electrostático
electromagnético
color
verde
blanco
azul
electrodo acelerador
tensión de corte
sensibilidad de la deflexión

TUBOS DE RAIOS CATODICOS

diâmetro da grelha
longitude do tubo
centimetros
pé
ângulo de deflexão em graus
método de deflexão e focagem
electrostático
electromagnético
cor
verde
branco
azul
grelha aceleradora
voltagem de fechamento
sensibilidade da deflexão

TUBI A RAGGI CATODICI

diametro dello schermo
lunghezza
centimetri
zoccolo
angolo di deviazione in gradi
sistema di deviazione e messa a fuoco
elettrostatico
elettromagnetico
colore
verde
bianco
blu
griglia accelatrice (elettrodo acceleratore)
tensione griglia negativa per spegnimento della traccia di ritorno
sensibilità di deviazione

TYPE	DIAM.	LENGTH	BASE	DEFL. ANGLE	DEFL. AND FOC.	Vf	If
	CM	CM		DEGR.	METHOD	V	A
3HP7	7,5	25	3	55	M	6,3	0,6
3NP4	6,5	25,4	6	42	M	6,3	0,6
4BP15	10	33,3	15	50	M	6,3	0,6
5FP4A	12,7	28,2	3	53	M	6,3	0,6
5FP7	12,7	28,2	3	55	M	6,3	0,6
5FP7A	12,7	29,2	3	53	M	6,3	0,6
5FP14	12,7	28,2	3	55	M	6,3	0,6
5TP4	12,7	29,8	30	50	M-E	6,3	0,6
5WP11	12,7	29	30	50	M-E	6,3	0,6
5WP15	12,7	29	30	50	M-E	6,3	0,6
7AP4	18	34,2	2	55	M-E	2,5	2,1
7BP1	17,7	33,6	3	55	M	6,3	0,6
7BP7	17,7	33,6	3	55	M	6,3	0,6
7BP7A	17,7	33,6	3	53	M	6,3	0,6
7CP1	17,7	34,1	12	57	M-E	6,3	0,6
7CP4	17,7	34,1	12	57	M-E	6,3	0,6
7DP4	18,2	35,7	39	50	M-E	6,3	0,6
7HP4	18,2	33	38	50	M	6,3	0,6
7MP7	18,2	32,3	31	50	M	6,3	0,6
7NP4	17,7	49,5	49	35	M-E	6,3	0,6
7QP4	18,2	32,7	31	52	M	6,3	0,6
8AP4 8AP4A	21,5	36,1	35	54	M	6,3	0,6
9AP4	23,1	53,3	7	40	M-E	2,5	2,1
9CP4	22,8	40,3	1		M	2,5	2,1
9GP7	22,8	43,1	3	55	M	6,3	0,6
9JP1	22,8	39,8	13	55	E-M-M	2,5	2,1
9LP7	22,8	38	3	55	M	6,3	0,6
9MP7	22,8	44,4	3	55	M	6,3	0,6
10BP4 10BP4A	26,6	44,7	38	50	M	6,3	0,6
10CP4	26,6	42,2	38	50	M	6,3	0,6

Va	ACCELERATOR GRID	CUTOFF-VOLTAGE	TYPE
V	V	V	
5000	150	15..45	3HP7
24000	-	60	3NP4
25000	-	75..175	4BP15
6000	250	25..60	5FP4A
7000	250	25..75	5FP7
7000	250	25..70	5FP7A
7000	250	25..75	5FP14
27000	200	40..100	5TP4
27000	200	42..98	5WP11
20000	200	40..100	5WP15
3500	-	67,5	7AP4
7000	250	50	7BP1
7000	250	50	7BP7
7000	250	25..70	7BP7A
7000	250	45	7CP1
6000	250	25..68	7CP4
6000	250	25..65	7DP4
6000	250	33..77	7HP4
7000	250	27..63	7MP7
75000	16000	155	7NP4
8000	300	33..77	7QP4
7000	-	27..63	8AP4 8AP4A
7000	250	25	9AP4
7000	-	90..110	9CP4
7000	250	45	9GP7
5000	-	90	9JP1
7000	250	60..100	9LP7
6000	250	25..75	9MP7
9000	250	27..63	10BP4 10BP4A
9000	250	30..66	10CP4

TYPE	DIAM.	LENGTH	BASE	DEFL. ANGLE	DEFL. AND FOC.	Vf	If
	CM	CM		DEGR.	METHOD	V	A
10DP4	26,6	44,7	37	50	M-E	6,3	0,6
10FP4	26,6	44,7	38	50	M	6,3	0,6
10FP4A	26,6	44,7	38	54	M	6,3	0,6
10KP7	26,6	44,7	31	50	M	6,3	0,6
10MP4 10MP4A	26,6	43,1	34	52	M	6,3	0,6
10NP11	26,6	44,7	34	52	M	6,3	0,6
12AP4	30,6	64,4	7	40	M-E	2,5	2,1
12CP4	30,6	47,3	1		M	2,5	2,1
12DP7	30,4	52,7	3	55	M	6,3	0,6
12DP7A	30,4	49,8	3	50	M	6,3	0,6
12JP4	30,4	44,4	31	50	M	6,3	0,6
12KP4 12KP4A	31,5	44,7	38	54	M	6,3	0,6
12LP4 12LP4A	31,5	47,6	38	54	M	6,3	0,6
12QP4 12QP4A	31,5	44,4	31	55	M	6,3	0,6
12RP4	30,4	44,4	31	56	M	6,3	0,6
12SP7	31,5	47,6	31	55	M	6,3	0,6
12TP4	31,5	47,6	31	54	M	6,3	0,6
12UP4 12UP4A 12UP4B	31,5	47,3	31	54	M	6,3	0,6
12VP4 12VP4A	31,4	45,7	34	55	M	6,3	0,6
12WP4	31,5	45	16	55	M	6,3	0,6
14BP4	32x25	42,7	38	65	M	6,3	0,6
14CP4	32x25	42,5	38	65	M	6,3	0,6
14DP4	32x25	42,5	31	65	M	6,3	0,6
14EP4	32x25	42	38	65	M	6,3	0,6
14GP4	32x25	42,5	36	65	M-E	6,3	0,6
15AP4	39,3	52	31	52	M	6,3	0,6
15CP4	39,3	54,6	31	50	M	6,3	0,6
15DP4	39,3	52	31	57	M	6,3	0,6

Va	ACCELERATOR GRID	CUTOFF-VOLTAGE	TYPE
V	V	V	
9000	250	36..84	10DP4
9000	250	27..63	10FP4
11000	250	27..63	10FP4A
9000	250	27..63	10KP7
9000	-	27..63	10MP4
18000	-	65..125	10NP11
7000	250	75	12AP4
7000	-	110	12CP4
7000	250	25..75	12DP7
7000	250	25..70	12DP7A
10000	250	27..63	12JP4
11000	250	27..63	12KP4 12KP4A
11000	250	27..63	12LP4 12LP4A
10000	250	27..63	12QP4 12QP4A
10000	250	27..63	12RP4
9000	250	27..63	12SP7
11000	250	27..63	12TP4
11000	250	27..63	12UP4 12UP4A 12UP4B
11000	-	33..77	12VP4 12VP4A
10000	-	27..63	12WP4
11000	250	27..63	14BP4
12000	300	33..77	14CP4
11000	250	27..63	14DP4
12000	300	33..77	14EP4
12000	300	33..77	14GP4
12000	250	27..63	15AP4
9000	250	45	15CP4
13000	250	27..63	15DP4

TYPE	DIAM.	LENGTH	BASE	DEFL. ANGLE	DEFL. AND FOC. METHOD	Vf	If
	CM	CM		DEGR.		V	A
16AP4 16AP4A	40,3	58,2	31	53	M	6,3	0,6
16CP4	41	51,4	31	52	M	6,3	0,6
16DP4 16DP4A	40,3	52,7	31	60	M	6,3	0,6
16EP4 16EP4A 16EP4B	40,3	49,8	31	60	M	6,3	0,6
16FP4	41	51,4	31	62	M	6,3	0,6
16GP4 16GP4A 16GP4B 16GP4C	40,3	45	31	70	M	6,3	0,6
16HP4 16HP4A	40,3	54	38	60	M	6,3	0,6
16JP4 16JP4A	41	52,7	38	60	M	6,3	0,6
16KP4 16KP4A	37x29	47,6	38	65	M	6,3	0,6
16LP4 16LP4A	40,3	56,5	38	52	M	6,3	0,6
16MP4 16MP4A	41	55,2	38	60	M	6,3	0,6
16QP4	37x29	48,2	31	65	M	6,3	0,6
16RP4	37x29	47,6	38	65	M	6,3	0,6
16SP4 16SP4A	40,3	44	38	70	M	6,3	0,6
16TP4	37x29	46	38	65	M	6,3	0,6
16UP4	37x29	46	31	65	M	6,3	0,6
16VP4	40,3	43,6	31	70	M	6,3	0,6
16WP4	40,3	45	31	70	M	6,3	0,6
16WP4A	40,3	45	38	70	M	6,3	0,6
16XP4	37x29	47,6	31	65	M	6,3	0,6
16YP4	40,3	44	38	70	M	6,3	0,6
16ZP4	40,3	56,5	38	52	M	6,3	0,6
17AP4	39x31	47,3	38	65	M	6,3	0,6
17BP4 17BP4A 17BP4B	39x31	48,8	31	65	M	6,3	0,6

Va	ACCELERATOR GRID	CUTOFF-VOLTAGE	TYPE
V	V	V	
12000	300	33..77	16AP4 16AP4A
12000	250	27..63	16CP4
12000	250	27..63	16DP4 16DP4A
12000	300	33..77	16EP4 16EP4A 16EP4B
13000	250	27..63	16FP4
12000	300	33..77	16GP4 16GP4A 16GP4B 16GP4C
12000	300	33..77	16HP4 16HP4A
11000	250	27..63	16JP4 16JP4A
14000	300	33..77	16KP4 16KP4A
12000	300	33..77	16LP4 16LP4A
12000	300	33..77	16MP4 16MP4A
14000	250	27..63	16QP4
12000	300	33..77	16RP4
12000	300	33..77	16SP4 16SP4A
12000	300	33..77	16TP4
12000	300	27..63	16UP4
12000	250	27..63	16VP4
12000	250	27..63	16WP4
12000	250	27..63	16WP4A
12000	250	27..63	16XP4
12000	300	33..77	16YP4
12000	300	33..77	16ZP4
12000	300	33..77	17AP4
12000	300	33..77	17BP4 17BP4A 17BP4B

TYPE	DIAM.	LENGTH	BASE	DEFL. ANGLE	DEFL. AND FOC.	Vf	If
	CM	CM		DEGR.	METHOD	V	A
17CP4	40x31	48,2	31	66	M	6,3	0,6
17FP4	39x31	48,8	36	65	M-E	6,3	0,6
17GP4	40x31	49	37	66	M-E	6,3	0,6
17HP4 17RP4	39x31	48,8	36	66	M-E	6,3	0,6
17JP4	39x31	48,8	38	65	M	6,3	0,6
17YP4	39x31	48,7	38	65	M	6,3	0,6
17QP4	39x31	48,7	38	65	M	6,3	0,6
17LP4 17VP4	39x31	48,7	36	65	M-E	6,3	0,6
17TP4	40x31	49	37	66	M-E	6,3	0,6
19AP4 19AP4A 19AP4B 19AP4C 19AP4D	47	54,6	31	66	M	6,3	0,6
19DP4 19DP4A	48	54,6	38	66	M	6,3	0,6
19EP4	43x33	53,6	31	65	M	6,3	0,6
19FP4	48	55,8	31	66	M	6,3	0,6
19GP4	48	54	31	66	M	6,3	0,6
19JP4	43x33	52,8	31	66	M	6,3	0,6
20BP4	50,7	73	31	54	M	6,3	0,6
20CP4	47x38	54,4	31	66	M	6,3	0,6
20CP4A			38				
20DP4	47x38	55,2	31	65	M	6,3	0,6
20DP4A	47x38	55,2	38	66	M	6,3	0,6
20FP4	47x38	55,2	37	66	M-E	6,3	0,6
20GP4	47x38	55,2	36	66	M-E	6,3	0,6
20HP4	47x38	55,2	37	66	M-E	6,3	0,6
20HP4A	47x38	55,2	36	66	M-E	6,3	0,6
21AP4	50x38	56,6	31	66	M	6,3	0,6
21EP4	51x40	58,4	31	65	M	6,3	0,6
21EP4A	51x40	58,4	38	65	M	6,3	0,6
21FP4	51x40	58,4	37	65	M-E	6,3	0,6

Va	ACCELERATOR GRID	CUTOFF-VOLTAGE	TYPE
V	V	V	
14000	300	33..77	17GP4
16000	300	33..77	17FP4
14000	300	33..77	17GP4
14000	300	33..77	17HP4 17RP4
16000	300	33..77	17JP4
16000	300	33..77	17YP4
14000	300	33..77	17QP4
14000	300	33..77	17LP4 17VP4
16000	300	33..77	17TP4
13000	250	27..63	19AP4 19AP4A 19AP4B 19AP4C 19AP4D
13000	250	26..63	19DP4 19DP4A
13000	250	26..63	19EP4
13000	250	27..63	19FP4
13000	250	27..63	19GP4
12000	300	33..77	19JP4
15000	250	25..70	20BP4
16000	300	33..77	20CP4 20CP4A
16000	300	33..77	20DP4
16000	300	33..77	20DP4A
16000	300	33..77	20FP4
16000	300	33..77	20GP4
14000	300	33..77	20HP4
14000	300	33..77	20HP4A
16000	300	33..77	21AP4
16000	300	33..77	21EP4
16000	300	33..77	21EP4A
16000	300	33..77	21FP4

TYPE	DIAM.	LENGTH	BASE	DEFL. ANGLE	DEFL. AND FOC.	Vf	If
	CM	CM		DEGR.	METHOD	V	A
21FP4A	51x40	58,4	36	65	M-E	6,3	0,6
21WP4	47x38	56,5	38	66	M	6,3	0,6
21ZP4	51x40	58,1	31	65	M	6,3	0,6
21ZP4A	51x40	58,4	38	65	M	6,3	0,6
22AP4 22AP4A	55	58,1	31	70	M	6,3	0,6
24AP4 24AP4A 24AP4B	61	60	31	70	M	6,3	0,6
24BP4	56,5	61,5	37	70	M-E	6,3	0,6
27AP4	64x51	54,2	37	86	M-E	6,3	0,6
27EP4	64x51	57,6	31	85	M	6,3	0,6
27GP4	64x51	57,7	31	84	M	6,3	0,6
27LP4	64x51	61,7	38	85	M	6,3	0,6
30BP4	76,5	59,8	31	90	M	6,3	0,6

Va	ACCELERATOR GRID	CUTOFF-VOLTAGE	TYPE
V	V	V	
16000	300	33..77	21FP4A
16000	300	33..77	21WP4
16000	300	33..77	21ZP4
16000	300	33..77	21ZP4A
14000	300	33..77	22AP4 22AP4A
15000	300	33..77	24AP4 24AP4A 24AP4B
14000	300	33..77	24BP4
15000	300	33..77	27AP4
16000	300	33..77	27EP4
20000	300	33..77	27GP4
20000	300	33..77	27LP4
22000	300	33..77	30BP4

TYPE	DIAM.	LENGTH	BASE	DEFL. ANGLE	DEFL. AND FOC.	Vf	If
	CM	CM		DEGR.	METHOD	V	A
MW6-2	6,5	26,8	56	67	M	6,3	0,3
MW13-35	12,5	28,7	57	53	M	6,3	0,3
MW22-7	23,1	37,2	58	64	M	6,3	0,6
MW22-14	23,1	37,2	58	64	M	6,3	0,3
MW22-16 MW22-17 MW22-18	23,1	37,2	59	64	M	6,3	0,3
MW31-7	30,8	46,3	58	63	M	6,3	0,6
MW31-14	30,8	46,3	58	63	M	6,3	0,3
MW31-16 MW31-17 MW31-18 MW31-74	30,8	46,3	59	63	M	6,3	0,3
MW36-24	32x25	42	60	65	M	6,3	0,3
MW36-44	32x25	42	61	65	M	6,3	0,3
MW41-1	40	46	62	70	M	6,3	0,3
MW43-43	41x27	48	63	66	M	6,3	0,3
MW43-43 02	41x27	48	64	66	M	6,3	0,6
MW43-64	39x27	48	61	65	M	6,3	0,3
MW53-20	51x39	58	65	65	M	6,3	0,3

Va	ACCELERATOR GRID	CUTOFF-VOLTAGE	TYPE
V	V	V	
25000	-	40..90	MW6-2
7000	300	30..70	MW13-35
9000	250	32..71	MW22-7
9000	250	32..71	MW22-14
9000	250	32..71	MW22-16 MW22-17 MW22-18
9000	250	32..71	MW31-7
9000	250	32..71	MW31-14 MW31-16 MW31-17 MW31-18
9000	250	32..71	MW31-74
10000	250	33..72	MW36-24
12000	250	33..72	MW36-44
12000	250	33..72	MW41-1
14000	250	40..86	MW43-43
14000	300	33..77	MW43-43 02
14000	300	40..86	MW43-64
16000	300	40..80	MW53-20

TYPE	DIAM.	LENGTH	BASE	COLOR	Vf	If	Va1
	CM	CM			V	A	V
2AP1	5	19	19	GREEN	6,3	0,6	125
2AP1A			24				250
2BP1	5,2	19,3	32	GREEN	6,3	0,6	300..560
3AP1	7,5	29	10	GREEN	2,5	2,1	170
3AP1A			11	GREEN			430
3AP4			10	WHITE			
3BP1	7,5	25,4	40	GREEN	6,3	0,6	430
3BP1A			45	GREEN			575
3CP1	7,5	26,3	20	GREEN	6,3	0,6	575
3DP1	7,5	26,5	42	GREEN	6,3	0,6	430
3DP1A			46				575
3DP7			46				280..516
3EP1	7,5	25,2	26	GREEN	6,3	0,6	575
3FP7	7,5	25,4	41		6,3	0,6	575
3FP7A			47				575
3GP1	7,5	29,2	18	GREEN	6,3	0,6	234
3GP4			18	WHITE			350
3GP1A	7,5	29,2	26	GREEN	6,3	0,6	245..437
3GP4A			26	WHITE			245..437
3JP1	7,5	25,4	47	GREEN	6,3	0,6	400..690
3JP12	7,5	25,4	47	OR.	6,3	0,6	300..515
3KP1	7,5	29	25	GREEN	6,3	0,6	160..300
3KP4			25	WHITE			320..600
3MP1	7,5	20,3	33	GREEN	6,3	0,6	400..700
3QP1	7	15,5	17	GREEN	6,3	0,3	240..480
3RP1	7,5	23,1	32	GREEN	6,3	0,6	330..620
3RP1A			32				330..620
3SP1	7,5x3,8	23,1	32	GREEN	6,3	0,6	165..310
3SP4			32	WHITE			330..620
5AP1	13,3	33	18	GREEN	6,3	0,6	430
5AP4	13,3	33	18	WHITE	6,3	0,6	430
5BP1	13,3	42,5	18	GREEN	6,3	0,6	310
5BP4			18	WHITE			425
5BP1A	13,3	42,5	26	GREEN	6,3	0,6	450
5BP7A	13,3	42,5	26		6,3	0,6	315..560
5CP1	13,3	42,5	41	GREEN	6,3	0,6	575
5CP4			41	WHITE			575
5CP1A	13,3	42,5	47	GREEN	6,3	0,6	575

Va2	Va3	CUTOFF-V.	DEFL.SENS. V/CM		TYPE
V	V	V	D1-2	D3-4	
500	-	15..45	46	39	2AP1
1000	-	30..90	92	78	2AP1A
2000	-	135 MAX	92..124	59..80	2BP1
600	-	14..40	19	18	3AP1
1500	-	25..75	46	43	3AP1A 3AP4
1500	-	22,5..67,5	67	50	3BP1
2000	-	30..90	80	59	3BP1A
2000	-	30..90	50	66	3CP1
1500	-	22,5..67,5	66	50	3DP1
2000	-	30..90	88	59	3DP1A
1500	-	22,5..67,5	60	44	3DP7
2000	-	30..90	88	66	3EP1
2000	2000	30..90	88	66	3FP7
2000	4000	30..90	100	72	3FP7A
1000	-	16,5..49,5	32	28	3GP1
1500	-	25..75	48	42	3GP4
1500	-	25..75	38..58	34..50	3GP1A
1500	-	25..75	38..58	34..50	3GP4A
2000	4000	30..90	70..92	50..108	3JP1
1500	3000	22,5..67,5	51..70	37..52	3JP12
1000	-	0..45	20..27	15..21	3KP1
2000	-	0..90	40..54	30..42	3KP4
2000	-	126 MAX	92..116	88..112	3MP1
1200	-	31..74	86..116	53..73	3QP1
2000	-	135	58..79	42..56	3RP1
2000	-	135	58..79	42..56	3RP1A
1000	-	28,5..67,5	29..40	21..28	3SP1
2000	-	28..135	58..79	42..56	3SP4
1500	-	31..57	37	36	5AP1
1500	-	17,6..57	37	36	5AP4
1500	-	20..60	25	23	5BP1
2000	-		34	30	5BP4
2000	-	20..60	34	30	5BP1A
2000	-	20..60	28..39	25..35	5BP7A
2000	4000	30..90	37	32	5CP1
2000	4000	30..90	37	31	5CP4
2000	4000	30..90	37	31	5CP1A

TYPE	DIAM.	LENGTH	BASE	COLOR	Vf	If	Va1
	CM	CM			V	A	V
5CP7A	13,3	42,5	47		6,3	0,6	575
5CP11A	13,3	42,5	47	BLUE	6,3	0,6	575
5CP12	13,3	42,5	47	OR.	6,3	0,6	575
5GP1	13,3	42,5	18	GREEN	6,3	0,6	425
5HP1	13,3	42,5	18	GREEN	6,3	0,6	310
5HP4			18	WHITE			425
5HP1A	13,3	42,5	26	GREEN	6,3	0,6	450
5JP1	13,4	42,5	21	GREEN	6,3	0,6	260
5JP4			21	WHITE			520
5JP1A	13,4	42,5	27	GREEN	6,3	0,6	333..630
5JP4A			27	WHITE	6,3	0,6	333..630
5LP1	13,4	42,5	22	GREEN	6,3	0,6	500
5LP4			22	WHITE			500
5LP1A	13,4	42,5	28	GREEN	6,3	0,6	376..633
5LP4A			28	WHITE			376..633
5MP1	13,4	40,3	10	GREEN	2,5	2,1	250
5MP4			10	WHITE			375
5NP1	13,4	42,5	18	GREEN	6,3	0,6	337
5NP4			18	WHITE			450
5RP1	13,3	42,5	44	GREEN	6,3	0,6	528
5RP4			44	WHITE			528
5RP1A	13,3	42,5	50	GREEN	6,3	0,6	362..695
5RP4A			50	WHITE			362..695
5SP1	13,3	47	48	GREEN	6,3	0,6	363..695
5SP4			48	WHITE			363..695
5UP1	13,3	37,4	32	GREEN	6,3	0,6	340..640
5VP7	13,3	42,5	26		6,3	0,6	315..562
5XP1	13,3	44,7	50	GREEN	6,3	0,6	362..695
5YP1	13,3	44,7	51	GREEN	6,3	0,6	541..1040
7EP4	17,7	39,3	26	WHITE	6,3	0,6	546..858
7GP4	17,7	36,8	45	WHITE	6,3	0,6	810..1200
7JP1	17,7	36,8	52	GREEN	6,3	0,6	1620..2400
7JP4			52	WHITE			1620..2400
7JP7	17,7	36,8	52		6,3	0,6	1620..2400
8BP4	22,2	41,9	45	WHITE	6,3	0,6	2000
9NP1	22,8	53,3	9	GREEN	2,5	2,1	1150
10GP4	25,4	47	45	WHITE	6,3	0,6	1250..1850
10HP4	25,4	48,8	45	WHITE	6,3	0,6	1200..1800

Va2	Va3	CUTOFF-V.	DEFL.SENS. V/CM		TYPE
V	V	V	D1-2	D3-4	
2000	4000	30..90	37	30	5CP7A
2000	4000	30..90	37	30	5CP11A
2000	4000	30..90	37	30	5CP12
2000	-	24..56	14	28	5GP1
1500	-	15..45	25	23	5HP1
2000	-	20..60	34	31	5HP4
2000	-	20..60	34	31	5HP1A
1000	2000	22,2..51,8	38	38	5JP1
2000	4000	45..105			5JP4
2000	4000	45..105	31..46	31..46	5JP1A
2000	4000	45..105	31..46	31..46	5JP4A
2000	4000	30..90	41	36	5LP1
2000	4000	30..90	41	36	5LP4
2000	4000	30..90	33..50	29..43	5LP1A
2000	4000	30..90	33..50	29..43	5LP4A
1000	-	16,5..49,5	26	24	5MP1
1500	-	15..45			5MP4
1500	-	15..45	34	31	5NP1
2000	-	20..60			5NP4
2000	20000	30..90	56..84	52..79	5RP1
2000	20000	30..90	56..84	52..79	5RP4
2000	20000	30..90	56..84	52..79	5RP1A
2000	20000	30..90	56..84	52..79	5RP4A
2000	4000	30..90	30..43	25..38	5SP1
2000	4000	30..90	30..43	25..38	5SP4
2000	-	90	22..31	18..25	5UP1
2000	-	20..60	28..39	25..36	5VP7
2000	20000	30..90	56..84	18..27	5XP1
3000	6000	45..135	43..65	14..21	5YP1
3000	-	43..100	42..64	36..55	7EP4
3000	-	36..84	37..49	30..40	7GP4
6000	-	72..168	74..98	60..81	7JP1
6000	-	72..168	74..98	60..81	7JP4
6000	-	72..168	74..98	60..81	7JP7
6000	-	72..168	58..80	50..80	8BP4
5000	-	45..135	76	70	9NP1
5000	-	60..140	50..66	40..54	10GP4
5000	-	60..140	44..60	34..46	10HP4

TYPE	DIAM.	LENGTH	BASE	COLOR	Vf	If	Va1
	CM	CM			V	A	V
12FP7	30	61	43		6,3	0,6	1250
12GP7	30	55,8	53		6,3	0,6	1143
12HP1	30	59,6	23	GREEN	6,3	0,6	1150
14AP1	34	61,5	29	GREEN	2,5	2,1	1000
14AP4			29	WHITE			
20AP1	50	71	29	GREEN	2,5	2,1	1000
20AP4	50	71	29	WHITE	2,5	2,1	1000
902	5	19	14	GREEN	6,3	0,6	150
902A	5	18,8	14	GREEN	6,3	0,6	150
905	13,3	42	4	GREEN	2,5	2,1	450
907			4	BLUE			
909			4				
905A	13,3	42	5	GREEN	2,5	2,1	450
908	7,6	29,2	11		2,5	2,1	430
908A	7,6	29,2	11	BLUE	2,5	2,1	430
912	13,3	42	54	GREEN	2,5	2,1	3000
913	4,1	12	55	GREEN	6,3	0,6	100
914	23,4	54,6	8	GREEN	2,5	2,1	1550
914A	23,4	51	8	GREEN	2,5	2,1	1550

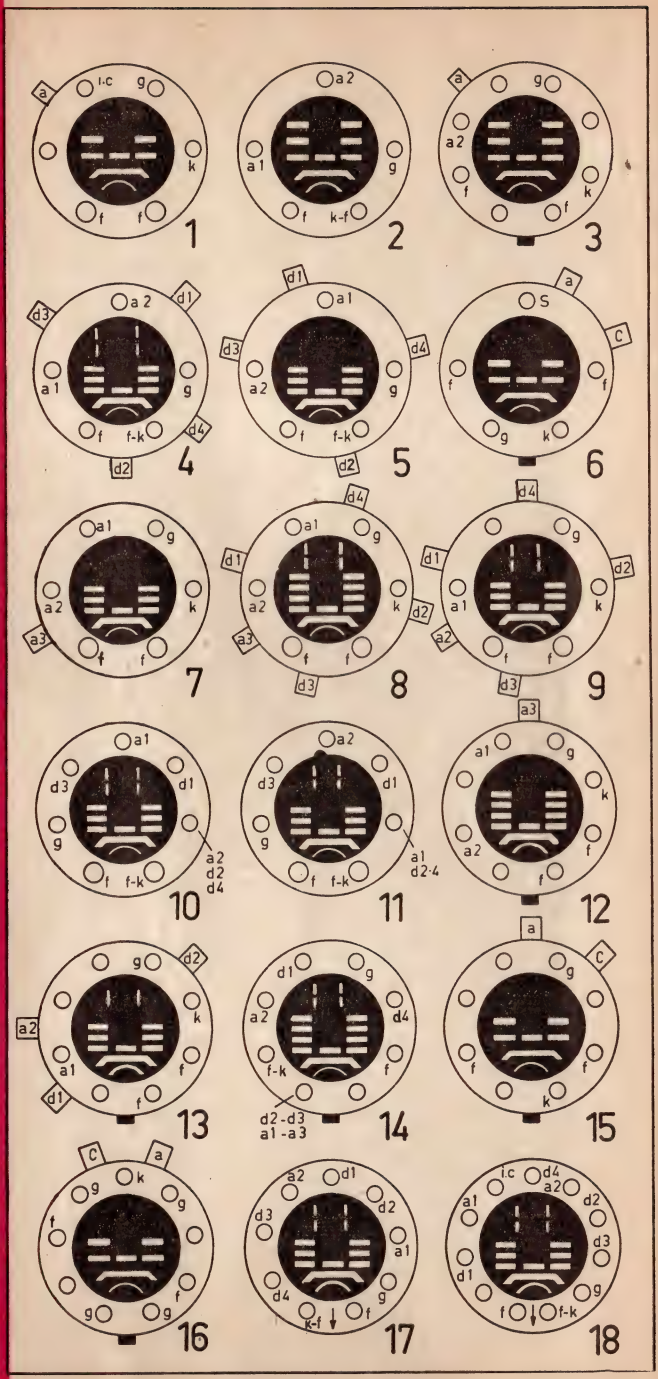
Va 2	Va 3	CUTOFF-V.	DEFL.SENS. V/CM		TYPE
V	V	V	D1-2	D3-4	
4000	8000	30..90	44	50	12FP7
4000	6000	65..195	43	40	12GP7
5000	-	45..135	38	50	12HP1
4000	8000	40..120	52	52	14AP1 14AP4
4000	8000	40..120	44	44	20AP1
4000	8000	40..120	52	52	20AP4
600	-	30..90	56	47	902
600	-	30..90	56	47	902A
2000	-	17,5..52,5	46	39	905 907 909
2000	-	17,5..52,5	46	39	905A
1500	-	25..75	46	43	908
1500	-	25..75	46	43	908A
15000	250 (g2)	30..90	366	300	912
500	-	20..60	120	88	913
7000	-	25..75	129	103	914
7000	-	25..75	129	103	914

TYPE	DIAM.	LENGTH	BASE	COLOR	Vf	If	Va1
	CM	CM			V	A	V
DB4-1 DG4-1 DP4-1	4,4	16	66	BLUE GREEN BLUE	6,3	0,31	200..300
DB4-2 DG4-2 DP4-2	4,4	16	66	BLUE GREEN BLUE	6,3	0,31	200..300
DB7-1 DG7-1	7,1	16	67	BLUE GREEN	4	1	150..350
DB7-2 DG7-2 DN7-2	7,1	16	68	BLUE GREEN GREEN	4	1	150..350
DB7-3 DG7-3 DN7-3 DR7-3	7,1	16	69	BLUE GREEN GREEN GR/YE	6,3	0,4	200..300
DB7-4 DG7-4 DN7-4 DR7-4	7,1	16	69	BLUE GREEN GREEN GR/YE	6,3	0,4	200..300
DB7-5 DG7-5 DP7-5 DR7-5	7,1	16	66	BLUE GREEN BLUE GR/YE	6,3	0,31	200..300
DB7-6 DG7-6 DN7-6 DP7-6 DR7-6	7,1	16	66	BLUE GREEN GREEN BLUE GR/YE	6,3	0,31	200..300
DG7-32	7,1	17	70	GREEN	6,3	0,3	0..120
DG7-36	7,7	29	71	GREEN	6,3	0,3	247..397
DB9-3 DG9-3 DN9-3	9,7	34	72	BLUE GREEN GREEN	4	1	200..400
DB9-4 DG9-4 DN9-4	9,7	34	72	BLUE GREEN GREEN	4	1	200..400
DB9-5 DG9-5 DN9-5	9,7	34	73	BLUE GREEN GREEN	4	1	230..430
DB10-2 DG10-2 DP10-2 DR10-2	9,7	34	74	BLUE GREEN BLUE GR/YE	6,3	0,3	400..720
DB10-3 DG10-3 DR10-3	9,7	34	72	BLUE GREEN GR/YE	4	0,56	200..340

Va 2	Va 3	CUTOFF-V.	DEFL.SENS. V/CM		TYPE
V	V	V	D1-2	D3-4	
800	-	50	40	62,5	DB4-1 DG4-1 DP4-1
800	-	50	40	62,5	DB4-2 DG4-2 DP4-2
800	-	30	45,4	71,4	DB7-1 DG7-1
800	-	30	45,4	71,4	DB7-2 DG7-2 DN7-2
800	-	50	38,5	62,5	DB7-3 DG7-3 DN7-3 DR7-3
800	-	50	38,5	62,5	DB7-4 DG7-4 DN7-4 DR7-4
800	-	50	38,5	62,5	DB7-5 DG7-5 DP7-5 DR7-5
800	-	50	38,5	62,5	DB7-6 DG7-6 DN7-6 DP7-6 DR7-6
500	-	90	25	40	DG7-32
1500	-	80	20	25	DG7-36
1000	-	40	20	32,25	DB9-3 DG9-3 DN9-3
1000	-	40	20	32,25	DB9-4 DG9-4 DN9-4
1000	5000	40	55,5	66,6	DB9-5 DG9-5 DN9-5
2000	-	100	28,5	37	DB10-2 DG10-2 DP10-2 DR10-2
1000	-	46	15,4	18,2	DB10-3 DG10-3 DR10-3

TYPE	DIAM.	LENGTH	BASE	COLOR	Vf	If	Va1
	CM	CM			V	A	V
DB10-5 DG10-5 DR10-5	9,7	34	73	BLUE GREEN GR/YE	4	0,56	200..340
DB10-6 DG10-6 DP10-6 DR10-6	9,7	34	74	BLUE GREEN BLUE GR/YE	6,3	0,3	400..720
DB10-7 DG10-7 DR10-7	9,7	34	75	BLUE GREEN GR/YE	6,3	0,3	340..640
DB13-2 DG13-2 DP13-2 DR13-2	13,5	43,5	76	BLUE GREEN BLUE GR/YE	6,3	0,3	400..720
DB16-1 DG16-1 DN16-1	16,7	45,7	77	BLUE GREEN GREEN	4	1	340..500
DB16-2 DG16-2 DN16-2	16,7	45,7	78	BLUE GREEN GREEN	4	1	340..500

Va2	Va3	CUTOFF-V.	DEFL.SENS. V/CM		TYPE
V	V	V	D1-2	D3-4	
1000	2500	46	27	31,25	DB10-5 DG10-5 DR10-5
2000	4000	100	36	45	DB10-6 DG10-6 DP10-6 DR10-6
2000	4000	100	40	52,6	DB10-7 DG10-7 DR10-7
2000	4000	100	26,3	30,3	DB13-2 DG13-2 DP13-2 DR13-2
2000	-	40	40	59	DB16-1 DG16-1 DN16-1
2000	-	40	40	59	DB16-2 DG16-2 DN16-2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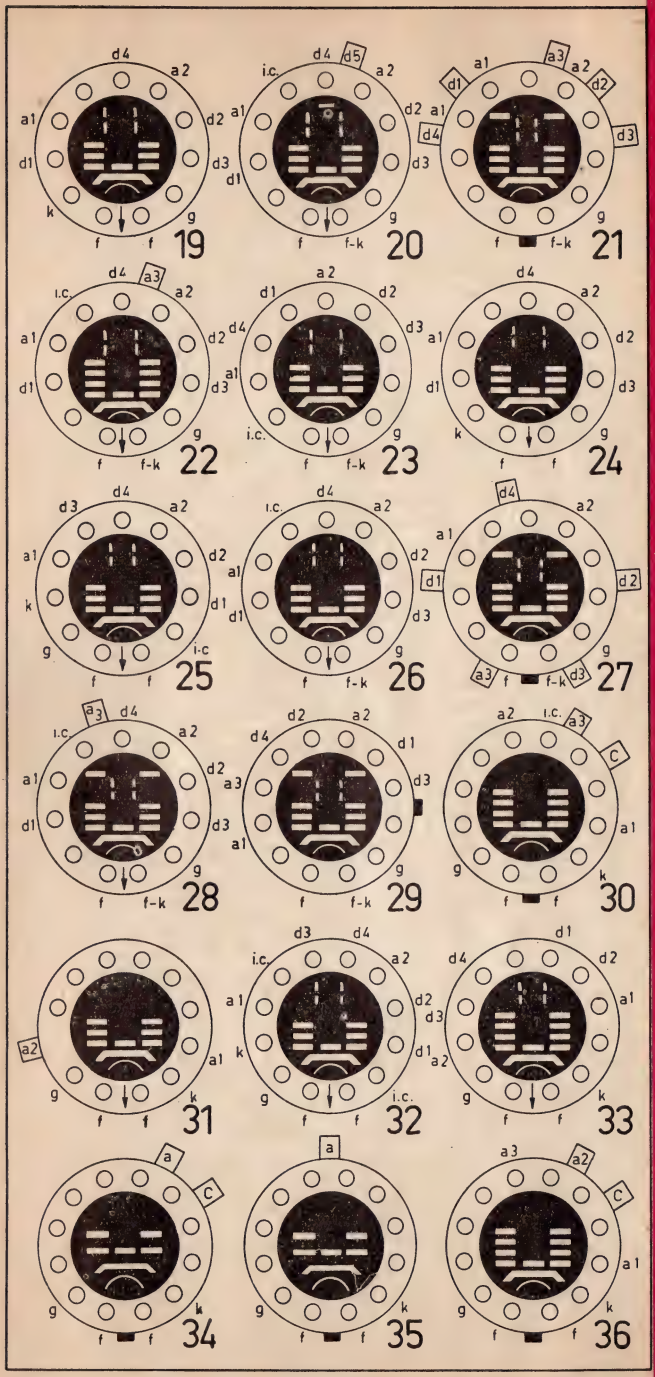
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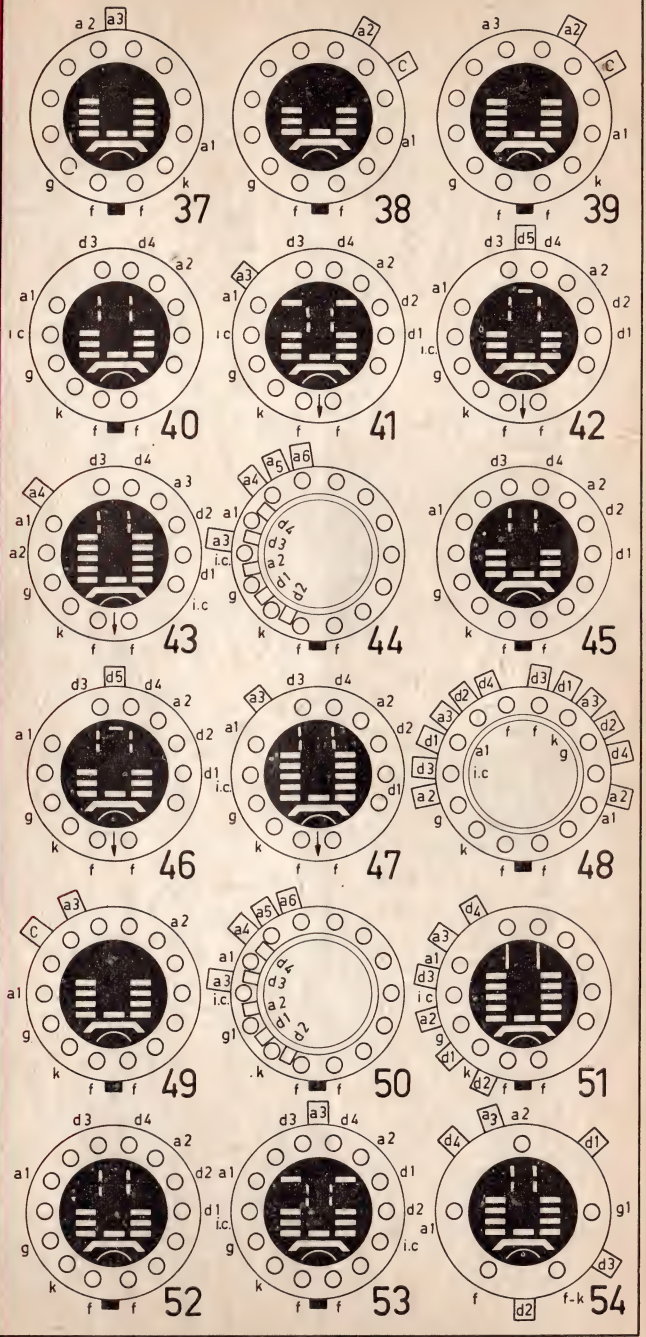
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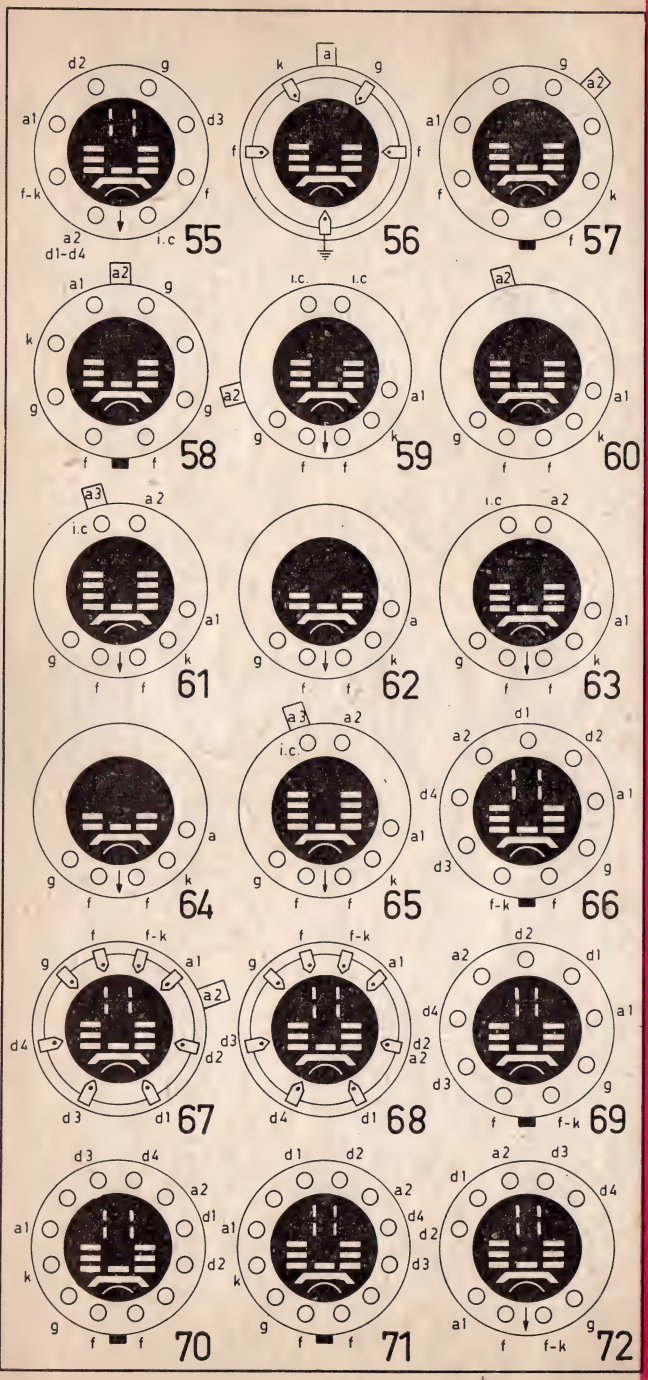
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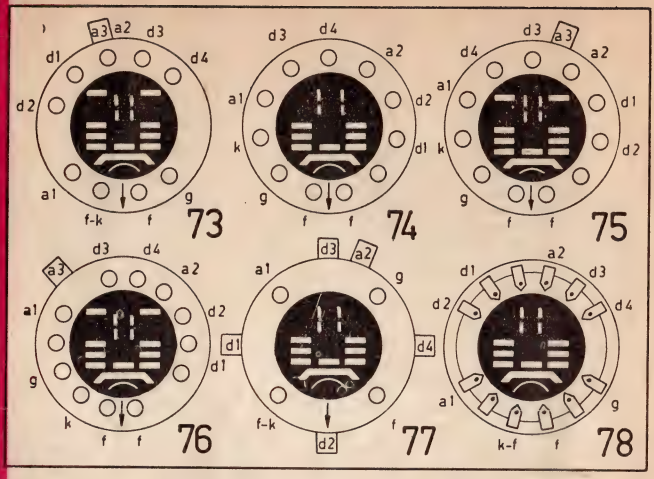

Stabilix

KWARTSKRISTALLEN

voor alle telecommunicatie en ultra-sonore toepassing.

SPECIAAL VOOR:

LUCHTVAART
SCHEEPVAART
RADIO INDUSTRIE
LABORATORIA e.d.

„STABILIX" KWARTS TECHNISCH BEDRIJF N.V.
HOBBEMASTRAAT 125 's-GRAVENHAGE TEL. 332497

NOTITIES:

BRITISH SERVICE TYPES WITH COMMERCIAL EQUIVALENTS					
S	C	S	C	S	C
AR7	CC2	NR60	AC2	VR106	CF3
AR8	KBC1	NR61	AF3	VR108	CF7
AR10	KBC1	NR64	EF11	VR119	AB1
AR12	KC1	NR66	AB2	VR129	AF7
AR18	6Q7 G				
AR21	EBC33	NR67	6L7 G	VR136	EF54
		NR68	6Q7 G		
ARDD1	10D1	NR69	EM1	VT52	EL32
ARDD3	6H6 G	NR70	AF7	VT60	807
ARDD5	EB34			VT60A	807
		NR71	AF7	VT65	6C5 G
ARH1	6L7 G	NR73	6N7 G		
		NR77	6L6 G	VT74	6J7
ARP1	KL1	NR78	6C5 G	VT77	EM1
ARP2	KF4				
ARP3	CF3	NR78A	6J5 G	W2077	6V6
ARP4	KF4	NR81	6K7 G	W2166	6C6
		NR83	6J7 G	W2167	6D6
ARP5	KF3	NR85	6F6 G	W3446	25L6
ARP8	AL5				
ARP11	AF7	NR86	EF5	W3792	5Z4
ARP12	KF3				
		NU20	5Y3		
ARP13	KF3				
ARP14	KF4	VI77	EM1		
ARP15	6K7 G				
ARP16	6J7 G	VR44	KBC1		
		VR46	AL5		
ARP17	6F6 G	VR49	KF4		
ARP19	SP41	VR53	EF39		
ARP25	KF3				
ARP26	AL4	VR54	EB34		
		VR55	EBC33		
ARP27	6C6	VR56	EF36		
ARP29	EF11	VR57	EK32		
ARP30	6B6				
ARP32	6V6 G	VR57A	EK2		
		VR65	SP61		
ARP34	EF39	VR65A	SP41		
ARP35	EF50	VR67	6J5 G		
ARP36	SP41				
		VR83	KF3		
ARTH1	6K8 G	VR87	EF50		
ARTH2	ECH35	VR87A	EF50		
		VR91	EF50		
ATS25	807				
ATS25A	807	VR91A	EF50		
		VR92	EA50		
NR41	KF3	VR100	EF11		
NR48	EBC33	VR101	EBC3		
NR49	EF36				
NR59	AL4				

S = SERVICE TYPE C = COMMERCIAL TYPE

BRITISH SERVICE TYPES WITH COMMERCIAL EQUIVALENTS					
C.V.	=	C.V.	=	C.V.	=
124	807	546	12SQ7	697	12SJ7
131	EF92	547	12SQ7 GT	698	12SJ7 GT
133	6C4	549	25A6	700	12SR7
135	EY91	550	25A6 GT	706	6U7 G
136	EL91	551	25L6 G	717	534 GY
137	EAC91	552	25L6	726	35Z3
138	EF91	553	25L6 GT	728	1P5 GT
140	6AL5	555	25Z5	729	5V4 G
159	AL1	558	25Z6	731	6F6 GT
173	EF55	559	25Z6 GT	732	6W4
283	6AL5	561	35L6	755	1A5 G
303	EF22	562	35L6 GT	756	1A5 GT
305	EF51	564	35Z3	757	1A6
346	EZ22	565	35Z3 GT	776	1LB4
375	EA50	567	35Z5	777	1LC5
378	GZ32	568	35Z5 GT	778	1LC6
380	EF54	569	ECC35	779	1LD5
394	EM34	571	50L6 GT	781	1LN5
417	EC91	572	6X5 G	782	1R5
450	EL38	573	6X5	783	1S4
452	6AT6	574	EZ35	784	1S5
453	6BE6	575	5U4 G	785	1T4
454	6BA6	578	6A8 G	786	1T5
455	12AT7	579	6A8	807	3A4
491	12AU7	580	6A7 GT	818	3Q4
492	12AX7	581	6C5 G	819	3Q5
493	6X4	582	6C5	820	3S4
501	EBF32	583	6C5 GT	841	5U4 GT
509	6V6 G	587	6Q7 G	842	5W4 G
510	6V6	588	6Q7	846	6AC7
511	6V6 GT	589	6Q7 GT	850	6AK5
512	6W7 G	590	6SJ7 G	852	6C4
515	6Y6 G	591	6SJ7	858	6J6
522	7B7	592	6SJ7 GT	859	6K8 G
525	12A6	593	GZ32	860	6K5 G
526	12A6 GT	594	6SH7	861	6K5 GT
531	12C8	595	6SH7 GT	862	6L5 G
534	12J5	617	80	865	6SD7 GT
535	12J5 GT	618	83	866	6SJ7Y
537	12SA7	619	6Z4	867	6SR7
538	12SA7 GT	659	1625	873	6ZY5 G
540	12SC7	660	6AC7	876	7A6
543	12SK7	661	6AB7	877	7A7
544	12SK7 GT	694	12SG7	878	7A8

BRITISH SERVICE TYPES WITH COMMERCIAL EQUIVALENTS					
C.V.	=	C.V.	=	C.V.	=
879	7B4	1335	SP41	1829	1T5 GT
880	7B5	1347	ECH35	1849	5W4
885	7C5	1364	807	1851	5X4 G
887	7C6	1374	807	1852	5X4
890	7E5	1402	CY31	1854	5Y3 G
891	7E6	1404	EF36	1856	5Y3 GT
893	7F7	1418	10D1	1857	5Y4 G
895	7H7	1426	EK2	1861	5Z3
897	7J7	1427	EF9	1862	6AQ5
898	7N7	1428	EBC3	1863	5Z4 G
899	7Q7	1429	EL2	1864	5Z4
900	7R7	1433	EC31	1865	EC81
901	7Y4	1434	EM4	1870	6A7
902	7W7	1463	CBL31	1882	6AG7
910	12A8 GT	1464	EF39	1886	EC80
916	12H6	1570	EK32	1887	6B6 G
917	12J7	1572	807	1893	6B8 G
918	12K7	1574	SP41	1894	6B8
919	12SF5	1578	EF50	1908	6F5 G
920	12SF5 GT	1581	ECH35	1909	6F5
921	12SF7	1699	SP41	1910	6F5 GT
922	12SH7	1700	SP41	1911	6F6
924	12SL7	1711	6B7	1912	6F6
925	12SN7	1715	EBC3	1926	6G6 G
927	12Z3	1753	35A5	1928	12BA6
930	14F7	1756	1629	1929	6H6 G
942	25Y5	1758	1L4	1930	6H6
1053	EF39	1762	6AK6	1931	6G6 GT
1054	EB34	1773	82	1932	6J5 G
1055	EBC33	1790	7Z4	1933	6J5
1056	EF36	1800	1A7 G	1934	6J5 GT
1057	EK32	1802	1A7 GT	1935	6J7 G
1060	807	1803	1C5 G	1936	6J7
1065	SP61	1804	EAC91	1937	6J7 GT
1067	6J5	1805	1C5 GT	1938	6K6 G
1071	5U4	1816	6Y3 GT	1940	6K6 GT
1074	6J7	1817	1G4	1941	6K7 G
1091	EF50	1818	1H5 G	1942	6K7
1092	EA50	1819	6P5 GT	1943	6K6 GT
1136	EF54	1820	1H5 GT	1944	6K8 G
1186	6F6	1821	1N5 G	1945	6K8
1268	5Y3	1823	1N5 GT	1946	6K8 GT
1300	10D1	1824	1Q5 G	1947	6L6 G
1301	6H6	1826	1Q5 GT	1948	6L6

BRITISH SERVICE TYPES WITH COMMERCIAL EQUIVALENTS					
C.V.	=	C.V.	=	C.V.	=
1950	6L7 G	2135	6BR7	3885	EF40
1951	6L7	2136	6BW6	3886	EF41
1955	EF91	2195	EF91	3887	EF42
1956	6N7 G	2235	EY84	3888	ECH42
1957	6N7	2522	6AS6	3889	EL41
1958	6N7 GT	2524	6AU6	3890	EL42
1959	5OC5	2526	6AV6	3891	EZ40
1961	12AU6	2527	6BA7	3892	AZ41
1962	6R7 G	2534	5OL6	4007	6AL5
1963	6R7	2547	83V	4009	6BA6
1964	6R7 GT	2548	84	4010	6AK5
1966	6SA7	2556	117L7	4011	6AS6
1967	6SA7 GT	2557	117N7	4012	6BE6
1969	6SC7	2558	117Z6	4019	6AQ5
1970	6SC7 GT	2721	EL81	4023	6AU6
1971	1T4	2726	EL83	4024	12AT7
1972	6SF5	2748	5Z4		
1973	6SF5 GT	2795	1L4		
1974	6S7 G	2796	6L6		
1975	6S7	2817	6L6		
1977	UL41	2821	ECC33		
1978	6SG7	2833	AF3		
1981	6SK7	2835	5R4		
1982	6SK7 GT	2843	6J6		
1984	6SL7	2844	6X4		
1985	6SL7 GT	2860	AZ1		
1986	6SN7	2862	AZ31		
1988	6SN7 GT	2875	CL4		
1990	6SQ7	2877	6AK5		
1991	6SQ7 GT	2882	6AL5		
1993	6SS7	2883	6AQ5		
1995	6ST7 G	2884	6AS6		
1996	6ST7	2901	EF86		
1999	1V	2925	EBF2		
2000	EF91	2926	EBL31		
2001	EF91	2929	ECH3		
2002	7D9	2938	EL33		
2003	7D9	2942	EM1		
2004	6AL5	3515	KB2		
2005	6AL5	3516	KK2		
2007	12AU7	3881	EB41		
2010	6J6	3882	EBC41		
2011	12AU7	3883	EAF42		
2128	ECH81	3884	ECC40		

AMERICAN SERVICE TYPES WITH COMMERCIAL EQUIVALENTS					
V.T.	=	V.T.	=	V.T.	=
52	6K6	117A	6SK7 GT	198A	6G6 G
65	6C5	124	1A5 GT	199	6SS7
65A	6C5 G	125	1C5 GT	201	25L6
66	6F6	126	6X5	201C	25L6 G
66A	6F6 G	126A	6X5 G	205	6ST7
68	6B7	126B	6X5 GT	206A	5V4G
74	5Z4	131	12SK7	207	12AH7 G
80	80	132	12K8	208	7B8
83	83	133	12SR7	209	12SG7
86	6K7	134	12A6	210	1S4
86A	6K7 G	135	12J5 GT	211	6SG7
86B	6K7 GT	135A	12J5	213A	6L5 G
87	6L7	138	1629	214	12H6
87A	6L7 G	145	5Z3	215	6E5
88	6R7	146	1N5 GT	221	3Q5 GT
88A	6R7 G	147	1A7 GT	223	1H5 GT
88B	6R7 GT	150	6SA7	229	6SL7 GT
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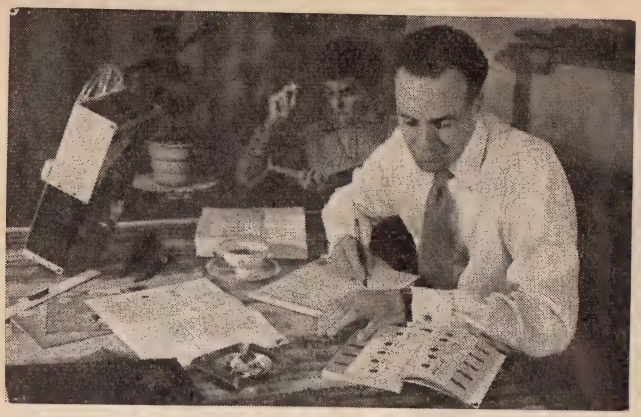


Dr BLAN SCHRIFTELIJKE RADIO CURSUS

Deze MK-cursus is in een zó bevattelijke trant geschreven, dat ieder, die lezen kan en enig gevoel voor techniek heeft, zonder meer de cursus tot het einde toe kan volgen. Hij is geschreven om een hobby behoorlijk gefundeerd te beleven: **anderen kunnen hem beschouwen als springplank voor verdere studie:** een hechte basis wordt slechts gevormd door goed begrip en hiernaar streven wij in deze cursus.

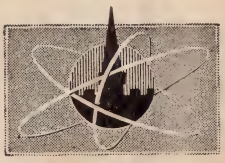
Waartoe leidt de MK-cursus op?

Deze cursus leidt op voor het Muiderkring-diploma en pretendeert ieder met gezond verstand, ongeacht zijn (of haar) leeftijd, in één jaar tijd zoveel kennis bij te brengen, dat hij zonder meer **het hoe en waarom van toestellen en versterkers weet, deze apparaten zelf kan bouwen en zich een bewust oordeel kan vormen over verschillende onderdelen en schakelingen, en meer diepgaande literatuur op dit gebied kan volgen.**

Bij verdere studie voor het diploma Radio Technicus N.R.G. of Middelbaar Radio-technicus heeft hij belangrijk méér dan een jaar voordeel van zijn MK-cursus; in feite bereiken we nagenoeg het peil van Radio-monteur.

Cursusgelden

Het cursusgeld bedraagt ƒ 6,— per maand — voor abonné's op Radio Bulletin en Handig Bekeken ƒ 5,— per maand — te voldoen op de eerste van iedere maand. Cursusduur: 12 maanden.



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CV784	303	CV917	304
CV785	303	CV918	304
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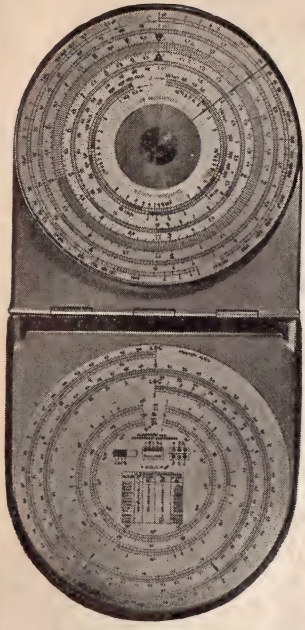
RADIO REKEN HULPMIDDELEN



REKENSCHIJF TYPE 746

In vorm en constructie wijkt de rekenschijf sterk af van de gangbare schuifliniaal en hieruit vloeien enkele zeer belangrijke voordelen. Ondanks het feit, dat de schaallengte even groot is als van een normale rekenliniaal, d.i. 25 cm, is het formaat veel practischer en vindt de schijf — belangrijk voor professionals — ruim plaats in de zijzak van werkjas of colbert. Een stevig metalen huis beschermt de schalen volledig en in opengeklapte stand dient het deksel als voet, waarop de schijf onder een hoek van ca 45° op tafel staat. Desgewenst kan men nu de schijf geheel met één hand bedienen en blijft de andere dus vrij voor notities.

Deze schijf bevat de volgende schalen:
Frequentieschaal 20 kHz — 500 MHz; Zelfinductieschaal 0,1 μH — 5 mH; Capaciteitsschaal 1—10.000 pF; Vaste en draaibare n^2 schaal (berekening tranformatieverhoudingen); Golflengteschaal 0,6 m — 15.000 m; decibelschaal van 0—120 dB.

Bestelnr. 746 - *f* 17,50

MK VESTZAKREKENSCHIJF TYPE 745

Alle schalen, die op de bureauschijf aanwezig zijn, vinden we ook aangegeven op voor- en achterzijde van de vestzakrekenschijf. Tevens is op deze schijf een Neperschaal aangebracht. Zeer aantrekkelijk formaat, wordt geleverd in lederen étui met ritssluiting en gebruiksaanwijzing. Bestelnr. 745 - *f* 7,—

U. M. DE MUIDERKRING

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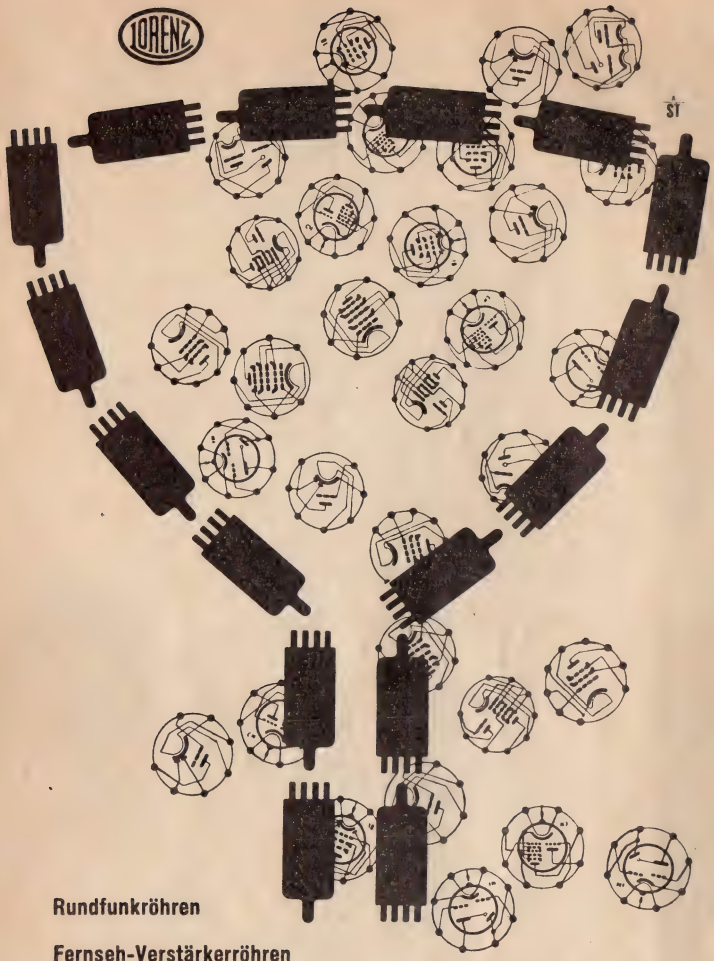

Rundfunkröhren

Fernseh-Verstärkerröhren

Bildröhren

Weitverkehrs-Röhren

Spezialröhren

C. Lorenz AG Stuttgart

LORENZ

Alleenvertegenwoordiging in Nederland:

Nederlandsche Standard Electric Mij. N.V.

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